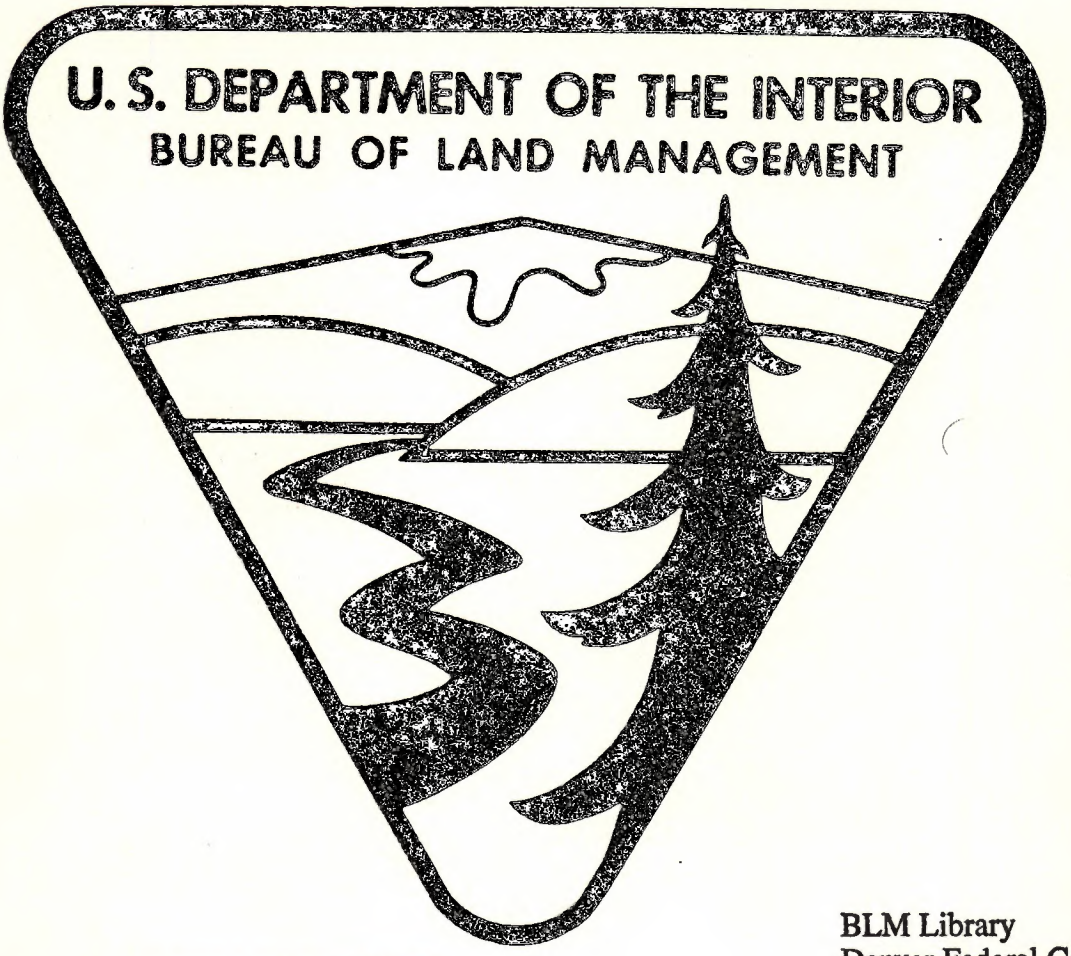
LIFE CYCLE MANAGEMENT



FOR

AUTOMATED INFORMATION SYSTEMS

TABLE OF CONTENTS

LIFE CYCLE MANAGEMENT

TABLE OF CONTENTS

LIFE CYCLE MANAGEMENT

TABLE OF CONTENTS

LIFE CYCLE MANAGEMENT

TABLE OF CONTENTS

ADP PROCEDURES

INTRODUCTION

CHAPTER 1

INTRODUCTION

PREFACE

Section 0.

Preface

A. Forward. Life Cycle Management (LCM) has long been an established set of procedures in the development of BLM Automated Information Systems (AIS). These procedures have been documented at various times in several different ways but have not been consistently followed and have not been formally adopted and applied throughout the Bureau.

B. Purpose. To formally establish LCM as a procedure that will be universally followed and to establish a mechanism for periodically reviewing and updating the procedure. The benefits of LCM are:

1. User Satisfaction. Users will better understand how the system will operate, how controls are used, and how to ensure that the system is responsive to their needs.
2. Accountability. All personnel involved will understand the ground rules for standardized development. Responsibilities will be more clearly defined.
3. Control and Security. Clearly defined responsibility and procedures will ensure proper control, management check points, and audit trails.
4. Utilization of Resources. A unified staff, in a common framework, will enhance the probability that an AIS will be developed, implemented, and operated on a cost-effective basis.
5. Visibility. A formal procedure will create timely attention from top management on personnel, hardware, and software needs.
6. Productivity. Clear task guidelines, scheduled review points, and disciplined, consistent procedures will keep everyone working toward the same goal. This should eliminate rework and wasted effort.
7. Motivation. Since LCM tasks can be frequently measured, timely feedback will provide both accountability and a sense of achievement.
8. Scheduling. Well documented design specifications, in user terms, helps users to understand the total project, minimizes changes to the scope of the project, and results in fewer crises and less rework.

Section 0 (Cont.)

9. Screening. Since checkpoints are established for management review, projects which do not meet requirements can be terminated prior to a significant expenditure of time or money.
10. Documentation. Project documentation, including the Users Guide and the Operations Guide, is required as a part of the LCM process.

INTRODUCTION

HOW TO USE THE GUIDE

Section 1.

How to Use the Manual.

A. Description. This guide is a comprehensive set of methods and administrative guidelines to help develop and maintain effective systems. It is a guide for managerial action throughout the chronological phases which make up a system life cycle. Detailed instructions are contained in other documents such as: The BLM Manual; GSA, OBM, and DOI circulars and regulations; the Strategic Plan for IS; and various IMs.

B. Organization. The guide is divided into chapters covering each particular subject. It is designed to follow the chronological steps in the life cycle of an automated information system.

C. Responsibility. The Office of Data Systems (D-200) is responsible for the development, distribution, and maintenance of the LCM Guide. The Deputy Director, Administration (800), is responsible for the implementation of the procedure and for scheduling audit and review to evaluate the effectiveness and to uncover any deficiencies. The Chief, Division of IS (870), is responsible for coordinating all actions necessary to ensure that these procedures are effectively implemented.

D. Applicability. Any information system project can benefit from the application of these procedures; however, past experience has demonstrated that short term or small projects should not require full formal management.

E. Documentation: The goal of all documentation is to create and maintain effective systems at the lowest cost. Documentation costs should not exceed 25% of the total cost except in special situations. The documentation levels presented in this document are intended to be guidelines to help scope out total costs and to prevent over documentation. (These guidelines are modified from FIPS PUB 38.)

Section 1 (Cont.)

1. Levels of Documentation.

a. Definitions of Levels.

To protect against both over and under documentation, computer program documentation has been divided into four levels. From lowest to highest these levels of documentation are:
(1) minimal level,
(2) internal level,
(3) working document[3] level, and
(4) formal publication level.
The criteria determining these levels of documentation are described in the following paragraphs, and summarized in Figure 2. Additional criteria peculiar to an installation and/or judgment relative to program sharing potential, life expectancy, and usage frequency are also appropriate factors to be considered in the determination of documentation levels.

(1) Minimal Level (Level 1).

Level 1 documentation guidelines are applicable to single use programs, or one-shot jobs, of minimal complexity. Although no significant documentation cost should be added, there exists the requirement to show what type of work is being produced and what a given program really does. Hence, it is desirable to keep on file, for a minimum period of time, the documentation which results from the development of the programs; i.e., program abstract, compile listing, test cases, etc. The criteria for categorizing a program as Level 1 can be its expected usage or the resource expended in its generation, in man-hours or dollars, and may be modified for the peculiar requirements of the installations. Suggested resource expenditure criteria are programs requiring less than two work-months effort or less than $3,000 (these are not assumed to be equal).

---

[3] The terms "working document" or "working paper" as used in this guideline refer to typewritten documents, not necessarilly prepared in finished format suitable for publication nor subject to external editorial review.

Section 1 (Cont.)

(2) Internal Level (Level 2).

Level 2 documentation applies to special purpose programs which, after careful consideration of the possible interest of others, appear to have no sharing potential and to be designed for use only by the requesting office. Large programs which have a short life expectancy also fall into this level. The documentation required (other than Level 1) is that necessary for JCL setup and modifications. This requirement can be satisfied by the inclusion of detail input/output formats, setup instructions, and the liberal use of comment cards in the source deck to provide clarification in the compile listing. In summary, the effort spent toward formal documentation for Level 2 programs should be minimal.

(3) Working Document Level (Level 3).

This level applies to programs which are expected to be used by a number of people in the same installation or which may be transmitted on request to other installations or to contractors. The format of the documentation at this level should include, as a minimum, all elements of documentation. All basic elements of documentation should be prepared in typewritten form, but not necessarily in a finished format suitable for publication. Normally, it will not be formally reviewed or edited above the review required for a working paper. However, if there are certain programs important to the activities of the installations, but not considered appropriate for publication, then local, more stringent documentation review standards should be applied.

Section 1 (Cont.)

(4) Formal Publication Level (Level 4).

This level applies to programs which are of sufficient general interest and value to be announced outside the originating installation. This level of documentation is also desirable if the program is to be referenced by a scientific publication or paper. The format of the documentation at this level should contain all elements of documentation prepared in finished typewritten format.

Also considered to be within this level are those programs which are critical to the activities of the installation. These programs should be documented in a formal, rigorous manner, with in-depth review and special configuration control procedures enforced. Recurring management applications, such as payroll, should be considered for inclusion in this category so as to maintain an accurate history of conformation to changing laws, rules, and regulations.

Section 1 (Cont.)

2. Cost and/or Usage Threshold Criteria for Extent and Formality

Level	If PROJECT COST	Or USAGE	Then Documentation ELEMENTS	And EXTENT OF EFFORT
1	Less than $3000 or two work-months	One Shot (Single use)	System Summary plus any incidentally produced documentation.	No special effort, normal good practice.
2	$3000 to $8000	Special or Limited Purpose or Application	Level 1 plus Users Manual and Operations Manual	Minimal documentation effort, spent on informal documentation. No formal documentation effort.
3	Over $8000	Multi-purposed or Multi-user	Level 2 plus Requirements Study Program Maintenance Manual, Test Plan, Test Result, and System/Subsystem Specification.	All basic elements of documentation should be typewritten, but need not be prepared in finished format for publication or require external edit or review.
4	Over $8000	Publicly Announced, or Critical to Operations	Level 3 produced in a form suitable for publication.	At a minimum, all basic elements prepared for formal publication including external review and edit.

Section 1 (Cont.)

2. Document Requirements by Weighting.

An alternative approach to determining levels of documentation is by weighting. Either of the two methods is acceptable in determining necessary documentation.

This scheme uses 12 criteria with weighting factors and a scale of the total weighted criteria to establish documentation requirements. Figure 4 illustrates the application of the weighted criteria as shown in Figure 3. The procedure to use these tables is:

1. Weight the software by the criteria in Figure 3.
2. Sum the weights assigned.
3. Find the row in Figure 4 that lists documentation required.

Section 1 (Cont.)

3. An Example of Weighting for Twelve Documentation criteria

Criteria	WEIGHTS 1	2	3	4	5
1. Originality required	None-reprogram on different equipment	Minimum-more stringent requirements	Limited-new interface	Considerable-apply existing state of	Extensive-requires advance in state of the art
2. Degree of generality	Highly restricted. single purpose	Restricted-parameterized for a range of capacities.	Limited-flexibility Allows some change in format.	Multi-purpose. Flexible format Range of subjects.	Very flexible-able to handle a broad range of subject matter on different equipment.
3. Span of operation	Local or utility	State wide	More than one state.	All states	Bureau-wide
4. Change in scope and objective	None	Infrequent	Occasional	Frequent	Continuous
5. Equipment complexity	Single machine Routine processing	Single machine. Routine processing. Extended peripheral system.	Multi-computer. Standard peripheral system.	Multi-computer. Advanced programming. Complex peripheral system.	Master control system. Multi-computer auto input/output and display equipment.
6. Personnel assigned	1-2	3-5	5-10	10-18	18 and over

Section 1 (Cont.)

Criteria	WEIGHTS (Cont.) 1	2	3	4	5
7. Developmental cost	1-10K	10-50K	50-200K	200-500K	Over 500K
8. Criticality	Data processing	Routine operations	Regulatory requirement	Critical to Bureau operations	Major Bureau program
9. Average response time to program change	2 or more weeks	1-2 weeks	3-7 days	1-3 days	1-24 hours
10. Average response time to data inputs	2 or more weeks	1-2 weeks	1-7 days	1-24 hours	0-60 minutes
11. Programming languages	High level language	High level and limited assembly language	High level and extensive assembly language	Assembly language	Machine language
12. Concurrent software development	None	Limited	Moderate	Extensive	Exhaustive

Section 1 (Cont.)

4. Total Weighted Documentation Criteria vs Required Document Types

TOTAL WEIGHTED CRITERIA	System Narrative	Users Manual	Operations Manual	Program Maintenance Manual	Test Plan	Requirements Study/ User Requirements Document	System/ Subsystem Design Specifications	Test Results	Development Project Proposal	Data Base Specifications	Disaster Recovery Plan
0-12*	X								X		
12-15*	X	X							X		
12-26	X	X	X	X	X	*		**	X	***	
24-38	X	X	X	X	X	X	*	**	X	***	
36-50	X	X	X	X	X	X	X	X	X	***	***
48-60	X	X	X	X	X	X	X	X	X	***	***

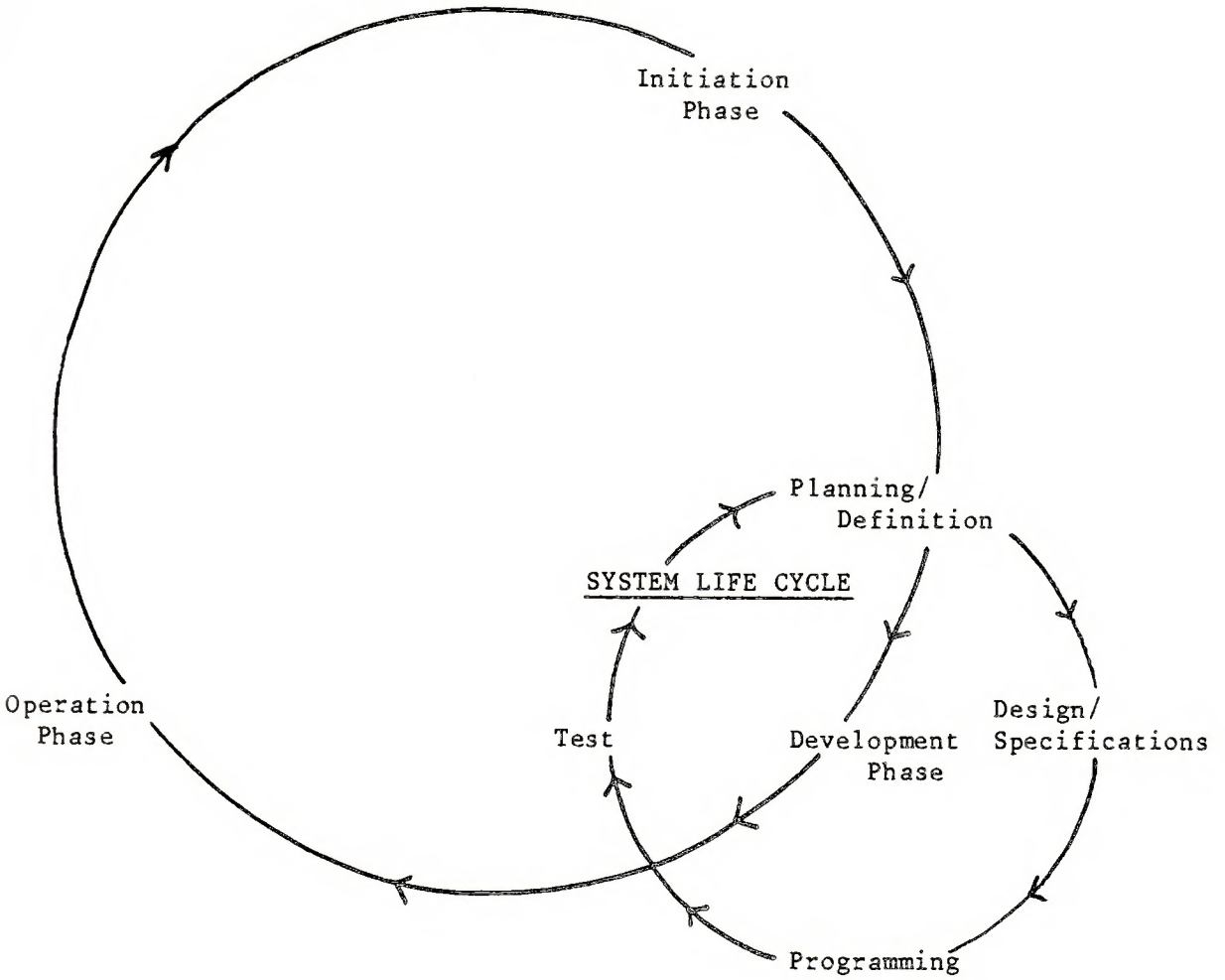
O Not provided for Review

NOTES:

* Additional document types may be required at lower weighted criteria totals to satisfy local requirements.

** The Test Analysis Report logically should be prepared, but may be informal.

*** Preparation of the Disaster Recovery Plan and Data Base Specification is situationally dependent.


Initiation
Phase
Planning/
Definition
SYSTEM LIFE CYCLE
Design/
Specifications
Development
Phase
Test
Programming
Operation
Phase

INTRODUCTION

SYSTEM LIFE CYCLE

Section 2.

System Life Cycle.

Computer programs and automated data systems evolve in phases from the time an idea to create the software occurs through the time that the software produces the required output. It is recognized that there are, in current usage, many different terminologies to identify these phases and the stages within these phases.

A. Phases.

Three phases applicable to the software life cycle are:

1. Initiation. During the Initiation Phase, the objectives and general definition of the requirements for the software are established.
2. Development. During the Development Phase, the requirements for the software are determined and the software is then defined, specified, programmed, and tested. Documentation is prepared within this phase to provide an adequate record of the technical information developed.
3. Operation. During the Operation Phase the automated system is placed into a production status and the software is maintained, evaluated, and changed as additional requirements are identified.

B. Stages.

The Development Phase is further subdivided into four stages.

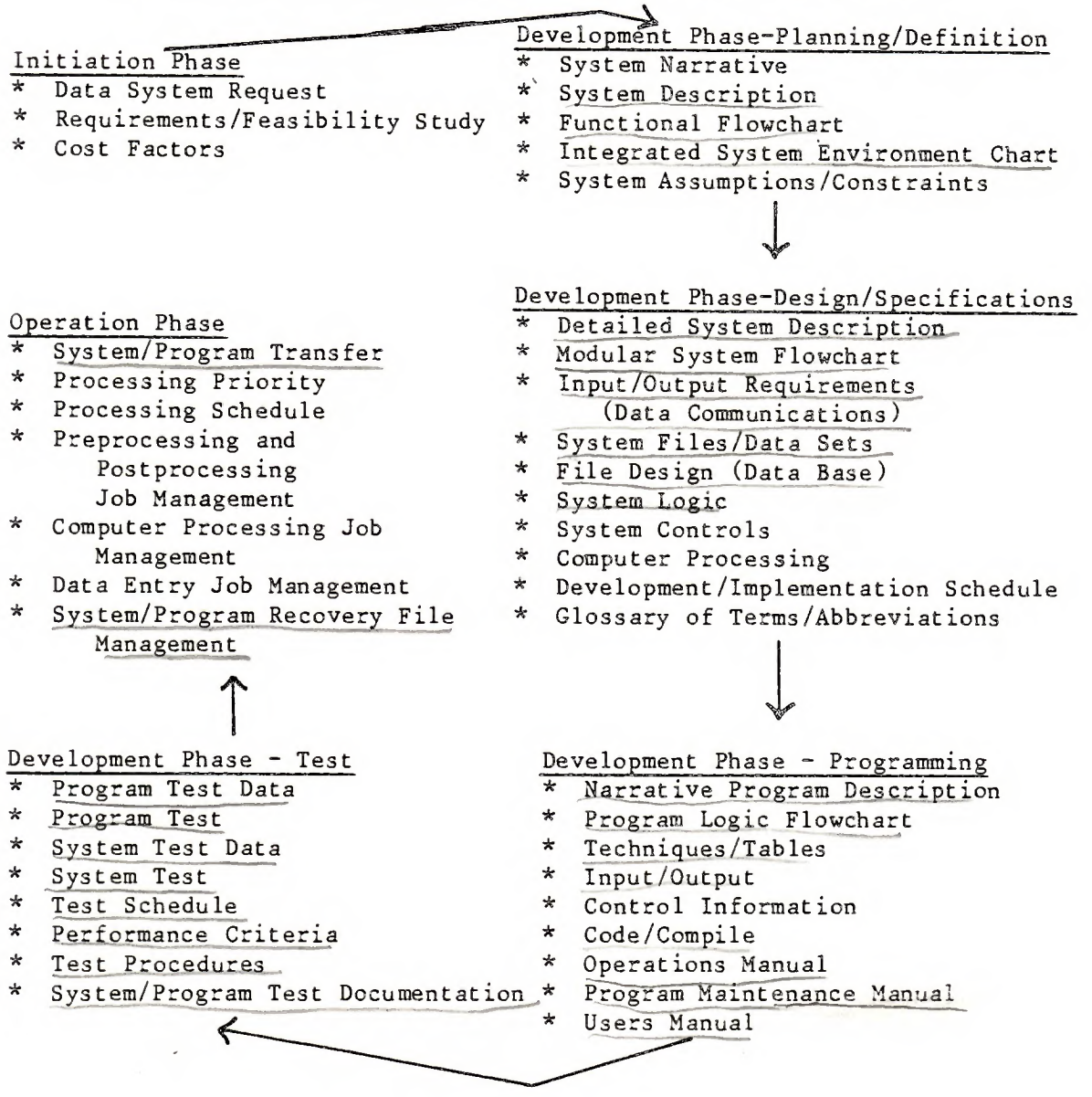
1. Planning/Definition. During the Planning/Definition Stage, the functional and data requirements for the software are determined.
2. Design/Specification. During the Design/Specification Stage, the design alternatives, specific requirements, and functions to be performed are analyzed and a design is specified.
3. Programming. During the Programming Stage, the software is coded and debugged. Documents which may be prepared during this stage include the Users Manual, Operations Manual, Program Maintenance Manual, and Test Plan.

SYSTEM LIFE CYCLE

Section 2 (Cont.)

4. Test. During the Test Stage, the software is tested and related documentation reviewed. The software and documentation are evaluated in terms of readiness for implementation.

The System Life Cycle is for use on all projects varying from very small and simple to large, complex, multi-team efforts.



PROJECT TEAMS

Section 3.

Project Teams.

A. General. Project teams draw together those skills that are required for each application. The teams are made up of analysts, programmers, users, etc., with the best available mix of skills and knowledge for a particular application. Individuals may be assigned to more than one project team, dependent upon the amount of work and timing required per project.

Combinations of the ideas, skills, work, and problem-solving contributions of all individuals on a team will add up to a total systems result superior to the best anyone can do on their own.

Such superior results become stronger as project teams utilize special skills of personnel throughout information systems and the user community. Project teams bring the strengths of the entire Division to bear effectively upon each project, large or small.

B. Project Team Authority. Project team authority consists of one simple rule - Any project, once defined and then approved under Division management procedures, will proceed to completion under project management, unless Division management changes or stops the project. Summarized, the rule is - Go until stopped.

Execution of this rule requires controlled management interaction with each project, plus the absolutely rigid precept that the project team must: Recognize problems on a weekly basis and start the solution to these problems during the week of discovery.

The controlled management device for interaction with each project will be based on FIPS.

Section 3 (Cont.)

The FIPS management device will be the System Life Cycle with phases of: Initiation, Development, (Planning/Definition, Design/Specification, Programming, Test), and Operations. Within the software life cycle, modular design will be the project team's key to good communications, work delegation, control over changes, and control of levels of documentation.

As an aid in bringing all necessary skills of the Division to each project, the walk-through team concept will be applied simultaneously at the end of each phase and the beginning of the next phase.

C. Project Evaluation and Review. Weekly, the project coordinator will report progress, dates for completion, problems and solutions, and problems that are anticipated to Division management. Reports to other organizational units (WO-870, Field Committee, Steering Committee) will be as established in the project plan. The rule of management by exception will be followed.

Division management's concurrence with all activity as shown in the project management weekly report will be assumed unless management otherwise directs. This practice is the implementation of the rule - Go until stopped.

Typical uses of the project system might be: The project team meets, discusses a problem, decides what to do about the problem, and projects the result upon project schedules. If satisfied, the changed data (management by exception) would be sent to the Branch Chief. The Branch Chief may agree but finds the total work load represented by all projects adds up to too much work for two individuals one month from now. The Branch Chief shifts one project and advises the Project Coordinator. The result is satisfactory to the Project Coordinator and the Branch Chief so the change is sent to the Division Chief.

The Division Chief finds that the Division doesn't have enough resources for all of the projects, selects one to be canceled or held, and tests his solution. Branch Management and the Division Chief agree, so the Division decision is made to scrap the project.

Section 3 (Cont.)

D. Team Members. Each team member plays an important role throughout the life of a project, and the absence of any one member can seriously degrade the outcome of the project.

1. Project Manager. The project will begin with the appointment of a Project Manager. This person is the formal coordination and control point for all activities of the project. He or she meets with both group and individual users, maintaining daily contact so that the users are cognizant of all major events. The Project Manager makes a formal report to management on at least a monthly basis. This report shows the status of each activity and includes recommendations and requests for any assistance. The Project Manager is responsible for the coordination and notification of meetings involving the User, the Analyst, the Programmer, the Data Base Administrator, and Management.
2. User. The User initiates the effort with Development Project Proposal (DPP) and should be available to assist other team members throughout the life of the project. The User's presence is necessary at all meetings; and it is vital that the User take part in the evaluation of test results. When he or she is satisfied with the test results, the system is formally accepted.
3. Analyst. The Analyst assists the Project Manager in coordination and control or may actually be the Project Coordinator. The Analyst counsels and advises other team members and participates in all phases of the System Life Cycle. He or she is responsible for the overall system design as well as the system testing and acceptance of the system.
4. Programmer. The Programmer may participate in the design stage of the project providing input relative to the technical state of the art. The Programmer is responsible for the coding and testing of the programs and interfaces with all other team members while accomplishing this task.

Section 3 (Cont.)

5. Data Base Manager. The Data Base Manager participates with development teams in all phases of the System Life Cycle. The Data Base Manager interfaces with all team members providing assistance, information, and counseling as required. Throughout, the role of the Data Base Manager is that of consultant and advisor.
6. Computer Operations. During development and testing, Computer Operations interfaces with the Project Coordinator, the Data Base Manager, the Analysts, and the Programmers.

The interfaces of the team members are many and complex. It is also highly probable that some members such as the Data Base Manager and Operations, may simultaneously be members of several teams involved in project efforts.

INTRODUCTION

WALK-THROUGH TEAMS

Section 4.

Walk-Through Teams.

A walk-through is a group review of some phase of a project's development for the purpose of detecting errors. No managers are present during the walk-through since the goal is for the peer group to detect errors. The person responsible for the work being reviewed is also responsible for conducting the walk-through.

Walk-through teams will be responsible for providing objective, positive-tone critiques and suggestions to project teams at controlled intervals during the System Life Cycle. A walk-through team will conform to the project rule of "Go until stopped" by referring unresolved action recommendations to management as an accompanying document to weekly project evaluation review reports.

Walk-through teams will review planning at the beginning of each phase of the System Life Cycle, and will review progress at the end of each such phase.

The personnel makeup of each walk-through team will be suited to each project and to each phase of each project, thus fully utilizing all skills of the Division of each customer. Users will be a part of each walk-through team.

When a project team must solve a problem during a phase of the System Life Cycle, and that problem requires skills beyond the assigned members of the project team, the walk-through team assigned to that phase will be convened to assist in solution development.

The members of the project team will also function as part of the walk-through team.

SOFTWARE LIFE CYCLE

COORDINATION AND CONTROL

Project Name_____ DPP No._____

	INITIATION		DEVELOPMENT															OPERATION
	PLANNING					DESIGN			PROGRAMMING					TEST				
	DATA SYS. REQUEST	APPR.	DEFINI-TION	WALK THRU	APPR.	SPECIFI-CATIONS	WALK THRU	APPR.	CODE	DOC	WALK THRU	APPR	PROG/SYS SOFTWARE	WALK THRU	APPR	PRODUC-TION	APPR.
User																	
Project Coordinator																	
System Analyst																	
Data Base Administrator																	
Programming																	
Operations																	
Walk-Thru Teams																	
Branch Chief																	
Division Chief																	

R - Prime Responsibility

S - Supportive Responsibility

_____
Project Coordinator

INTRODUCTION

SYSTEM LIFE CYCLE COORDINATION AND CONTROL

Section 5.

System Life Cycle Coordination and Control.

This section will discuss the System Life Cycle Coordination and Control Document, its use and preparation, and give a brief overview of the phases of the System Life Cycle as applicable to automation projects. Further detail regarding these phases and the duties and responsibilities of the team members is provided in the following sections.

A. Purpose. The purpose of the System Life Cycle Coordination and Control Document is to control and document the required entities related to project development.

The document contains a table of entries covering all points to be coordinated and controlled.

Down the left side of the document the persons or functions are listed. Across the top of the document, the entries cover the tasks to be completed. The document will record the status of each project effort and the status of each individual part of each project. For a very large project, several of these forms may be needed. Perhaps one at a high level for the overall control and others at a detailed level for sub-parts of the project.

B. How to Use the Form. The form is initiated by the Project Coordinator at the beginning of the effort, and is active for the life of the project.

The form should be initialed and dated by the responsible party as each task is completed.

The form, when properly prepared, will document both the tasks to be performed and persons or functional units involved.

C. A brief explanation of the illustration follows:

1. Initiation Phase. The objectives and general definition of the requirements for the software are established.
    a. Development Project Proposal (DPP). The effort is initiated by the user with a DPP. This work may be coordinated with data processing.

Section 5 (Cont.)

b. Approval. A review and evaluation of the request is performed by data processing and presented to management for approval.

2. Development Phase. The requirements for the software are determined and the software is then defined, specified, programmed, and tested. Documentation is prepared within this phase to provide an adequate record of the technical information developed.

a. Planning Stage.

1) Definition. Functional and data requirements for the software are determined.

2) Walk-Through. A review and evaluation of the Planning Stage is conducted by members of a walk-through team.

3) Approval. Upon completion of the walk-through the Planning Stage must be approved by the user and management.

b. Design Stage.

1) Specifications. The design alternatives, specific requirements, and functions to be performed are analyzed and a design is specified.

2) Walk-Through. A review and evaluation of the Design Stage is conducted by members of a walk-through team.

3) Approval. Upon completion of the walk-through the Design Stage must be approved by the user and management.

c. Programming Stage.

1) Coding. The software is coded and debugged.

2) Documentation. Documents which may be prepared during this stage include the Users Manual, Operations Manual, and Program Maintenance Manual.

3) Walk-Through. A review and evaluation of the Programming Stage is conducted by members of a walk-through team.

4) Approval. Upon completion of the walk-through the Programming Stage must be approved by management.

Section 5 (Cont.)

d. Test Stage.
   1) System/Program(s) Software. The software is tested and related documentation reviewed. The software and documentation are evaluated in terms of readiness for implementation.
   2) Walk-Through. A review and evaluation of the Test Stage is conducted by members of a walk-through team.
   3) Approval. Upon completion of the walk-through the Test Stage must be approved by the user and management.

3. Operation Phase. Upon completion of the Test Stage the system is placed into a production status, and the software is maintained, evaluated, and changed as additional requirements are identified.
   a. Production Turnover. Assure that all system and program documentation is complete, and that the system can be operated in the manner specified by the documentation.
   b. Approval. The production system must be approved by the user and ADP management.

ADP PROCEDURES

INITIATION PHASE

CHAPTER 2

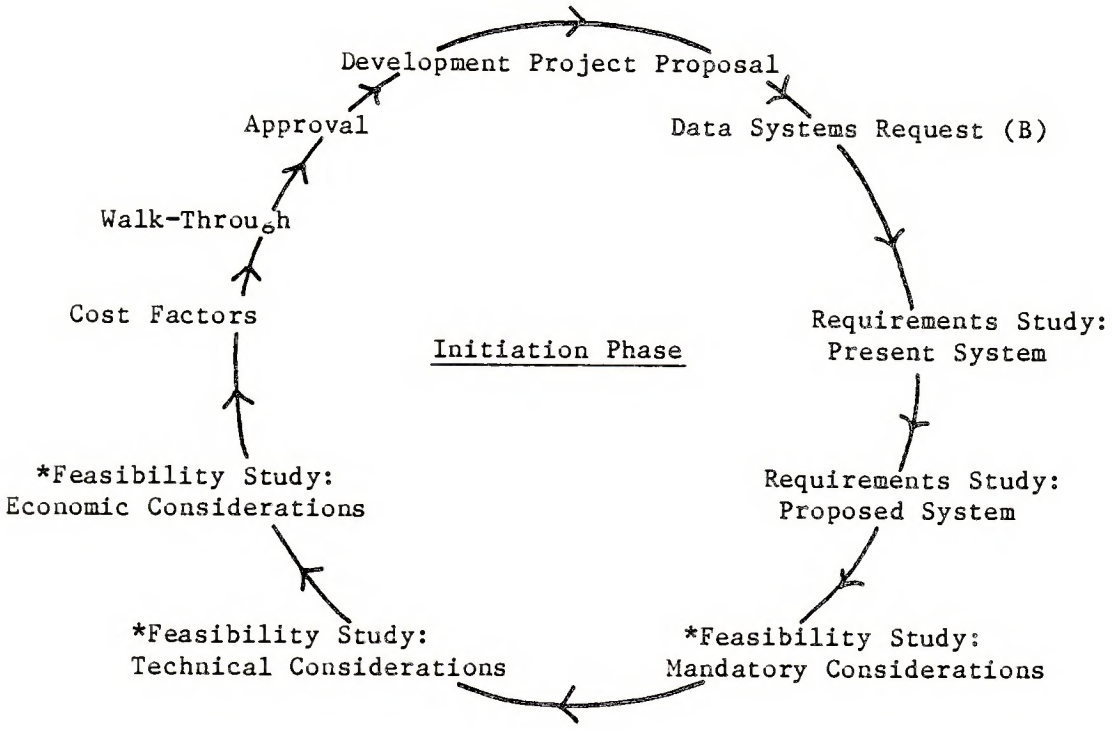
INITIATION PHASE

INTRODUCTION

Section 0.

Introduction

During the Initiation Phase, the objectives and general definition of the requirements for the software are established.



* As Required.

INITIATION PHASE

DEVELOPMENT PROJECT PROPOSAL

Section 1.

Development Project Proposal

A. Purpose. The Development Project Proposal (DPP) (Form No. 1181-1) provides a convenient method to document a request for services. The DPP provides sufficiently detailed information to enable management to review and evaluate the request within the established constraints and scope of their responsibility.

B. Responsibility. The requesting organization and/or the Project Coordinator will have primary responsibility for the preparation of the DPP. The Office of the Chief, Division of Information Systems will assign DPP numbers.

C. Contents. The DPP is designed for the requestor to describe the request in terms of results. Assistance is available from I.S. personnel.

D. DPP Preparation Instructions
   1. Objective Statement. Include in this section a concise description of the request. It must contain the objectives and the organizations affected.
   2. Justification. Clearly state the reasons for the proposal, show expected benefits and cost savings.
   3. Project Plan. A project plan must accompany each DPP.

This project information is critical to analysis and to possible approval by the WO for funding. Be clear but concise. Items I-V are the most important. Items VI and VII are the originating office's general ideas and estimates.

I. Title - Same as Form 1681-1 Date - Same as on Form 1681-1.

II. Problem or Need (what) - Reason for proposal.

III. Recommendations and Objectives (what) - Originating office's recommendations on what to do about problem or need, and the objectives of the proposed developmental project.

IV. Description - General description of project (what).

V. Justification (why) - Include any background, benefits, rationale, etc.

Form 1681–1
(May 1981)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DEVELOPMENT PROJECT PROPOSAL

☐ BUREAUWIDE ☐ SPECIFIC

NUMBER	
Assigned (WO)	Subactivity (Field)
Priority (WO)	
Recommended lead office (Field)	

Project Title

Type of project

☐ Information Systems ☐ Energy and Minerals ☐ Rec. and Environmental Areas ☐ Tech. Services
☐ Renewable Resources ☐ Lands and ROW ☐ Policy and Budget ☐ Administration

Objective statement *(summary)*

Justification *(brief summary)*

COSTS SUMMARY		
ITEMS	NUMBER	AMOUNT
Workmonth		$
Procurement		$
Equipment		$
TOTAL		$

☐ Annual Work Plan Recommended FY ☐ Annual Work Plan Supplement to FY ☐ Continuing Project % completed prior to this FY % to be completed this FY

Initiated at ☐ WO ☐ SO ☐ SC ☐ BIFC/OCS	Office	Division	Originator's Name and Phone No.

ommended by *(signature)* Date

Approved by *(signature)* Date

Instructions – Originator completes and submits form to appropriate WO Office.

GPO 831 – 193

INITIATION PHASE

DEVELOPMENT PROJECT PROPOSAL

Section 1 (Cont.)

VI. Plan for Work (How, who, where, when) - This is the initiator's proposal on these suggested items. The evaluation process will determine specific needs and recommendations.

Procedures, including possible alternatives.

Proposed location of work and recommended lead office. Should SO/DO handle, etc?

Personnel - Types and amount needed including number and source (office or staff) of WMs.

Cost and funding sources (subactivities) - (1) WMs and costs, (2) procurement items and costs, (3) equipment items and costs, and (4) total costs.

Time Schedule - Sequence of required work, completion dates, number of fiscal years involved.

Outputs Produced - What are these?

VII. Priority - Recommendations on urgency of work. Insert in current year's AWP and drop other work? Start next FY, etc?

NOTE - A project started in one FY and carried forward into another will be a "Continuing Project" and checked as such on Form 1681-1. After the first year only Form 1681-1 will be completed. The additional project description, according to the above format, is not needed unless the project approach has been changed. However, refined costs estimates will be developed each year. The lead office conducting the project will complete the form for the subsequent years after project initiation.

INITIATION PHASE

PROJECT TEAM ADMINISTRATION

Section 2.

Project Team Administration

A. Upon receipt of an approved DPP, the Service Center Director (SCD) will:
   1. Assign to the appropriate Office Chief who will:
      a. Appoint Project Manager.
      b. Complete Software Life Cycle Coordination and Control Form(s).
      c. Select project team analyst(s) and/or programmer(s).
      d. Define brief objectives and general requirements in writing for each project phase.
      e. Develop Requirements/Feasibility study as required.
      f. Complete Data Systems Request.
      g. Prepare initial project management data for the Software Life Cycle (PERT).

B. Walk-Through. The members of the walk-through team will vary in accordance with the material being reviewed. The walk-through is chaired by the Project Coordinator and conducted by the individual responsible for the material.

   The purpose of the walk-through is to determine if all requirements of the users' request have been defined and to evaluate the project definition for completeness and accuracy. Review the work plan for the Planning/Definition Phase during the walk-through and make adjustments to the plan and project management data as required.

   The Initiation Phase must be approved by the responsible individuals and management before the Planning/Definition Phase can be initialized.

DATA SYSTEMS REQUEST

FROM ORGANIZATION LOCATION

_____

_____

DSR DATE_____ DSR NO._____

SYSTEM NAME_____

_____

_____

PRELIMINARY ADP ESTIMATE OF COSTS AND WORK MONTHS

	ONE TIME		
	WORK-MONTHS	COSTS	ANNUAL
SYSTEMS DESIGN			
PROGRAMMING			
INPUT (KEYPUNCH ETC.)			
CLERICAL (CONTROL ETC.)			
COMPUTER OPERATIONS			
OTHER			
TOTAL			

_____

COMMENTS:_____

_____

ACTION:

[] FEASIBILITY STUDY RECOMMENDED

[] RETURNED FOR ADDITIONAL INFORMATION (SEE COMMENTS)

[] APPROVED SCHEDULE FOR COMPLETION BY_____

[] OTHER_____

_____

SIGNATURE_____

INITIATION PHASE

DATA SYSTEMS REQUEST

Section 3.

Data Systems Request

A. Purpose. The Data Systems Request (DSR) (Form No. ___) is designed for ADP Management to summarize the estimated data processing costs/work months and advise the requestor of the action that will be taken.

B. Responsibility. The data processing project team is responsible for the preparation of the DSR for management approval.

C. DSR Preparation Instructions.

1. ADP Estimate of Costs and Work Months - Preliminary.
   a. This section will include:
      1) Data processing costs for implementing and operating a new system or changes.
      2) Work months (173 hours) for implementing a new system or changes.
2. Comments. ADP management will include any comments relative to the requested system.
3. Action. ADP management will indicate the disposition of the Data Systems Request.

INITIATION PHASE

REQUIREMENTS/FEASIBILITY STUDY

Section 4.

Requirements/Feasibility Study

A. Purpose. The Initiation Phase utilizes a Requirements/Feasibility Study, as required, to provide detailed information for evaluation of the economic and technical feasibility of a proposed system. The Requirements/Feasibility Study further clarifies the DPP and is required for all requests for new systems or changes to existing applications where the estimated development exceeds six work years; or the development and/or operational costs exceed $150,000.

B. Responsibility. The Requirements/Feasibility Study is divided into two parts: Requirements and Feasibility. The requesting organization and/or the ADP Project Manager will be primarily responsible for the preparation of Part 1 (Requirements), while Part 2 (Feasibility) will be a joint effort of the requesting organization and ADP Management.
   1. Requirements - Part 1.
      a. Present System.
      b. Proposed System.
   2. Feasibility - Part 2.
      a. Mandatory/Technical/Economic Considerations.

C. Contents. The Requirements are written by the requestor to describe the requirements of a proposed system in his own terms. The Feasibility Study elaborates on this description . . and presents the system and its cost in more detail and in a more technical manner by the systems staff.

D. Requirements Study - Present System
   1. State the title of the PRESENT System.
   2. List the departments and sections affected by the PRESENT System and describe their involvement.
   3. Prepare a functional diagram depicting the PRESENT System. The diagram should graphically portray the flow of information within the user organization and/or data processing. Each input, output, file, and processing activity must be clearly labeled with its name and volume. This diagram must also depict the relationship between the PRESENT System and external systems with which it interfaces.

Section 4 (Cont.)

4. In a clear, concise, narrative form, describe the PRESENT System. This narrative must:
   a. Describe the functions of the system.
   b. Include a description of the objectives and state how these objectives are met.
   c. Specify when, where, and who originates input. The narrative must specify the type, contents, source(s), frequency, preparation, transmission, control, and balancing criteria of the input. (Examples of the input forms and input contents are to be attached.)
   d. Describe the output. The narrative must specify the type, contents, distribution, frequency, control, and balancing criteria of the output. (Examples of output forms and output contents are to be attached.)
   e. Describe the files. The narrative must specify the type, contents, source, use, sequence or organization, and retention of the files. If the file volumes fluctuate, this must be indicated. An explanation of how each file is updated with current information, or how outdated data is deleted, must be included.
   f. Itemize and describe the pertinent tasks which are performed.
   g. Describe in detail all manual operations that are required.
   h. Detail all machine requirements.
   i. Include all formula, tables, and calculations being used.
   j. Include a description of all handling and user controls to be employed.
   k. Describe in detail how the PRESENT System interfaces with existing or proposed machines or manual systems.

   The narrative must explain why a Requirements Study is necessary. It must detail the problems anticipated with the current system and the new goals to be achieved.

E. Requirements Study - Proposed System.
   1. State the title of the PROPOSED System.

Section 4 (Cont.)

2. List the departments and sections affected by the PROPOSED System and describe their involvement.
3. Prepare a functional diagram depicting the PROPOSED System. This diagram should graphically portray the flow of information within user organization(s) and/or data processing. Each input, output, file, and processing activity must be labeled clearly with its name and volume. This diagram must also depict the ralationship between the PROPOSED System and the external system(s) with which it interfaces.
4. In a clear concise narrative form, describe the PROPOSED System. This narrative must:
   a. Describe the functions.
   b. Include a description of the objectives and state how these objectives are to be met.
   c. Specify when, where, and who originates input. The narrative should specify the type, contents, source(s), frequency, preparation, transmission, control, and balancing criteria of the input. (Examples of the input forms and input contents are to be attached.)
   d. Describe the output. The narrative must specify the type, contents, distribution, frequency, control, and balancing criteria of the output. (Examples of output forms and output contents are to be attached).
   e. Describe the files. The narrative must specify the type, contents, source, use, sequence or organization, and retention of the files. If the file volumes fluctuate, this must be indicated. An explantion of how each file is updated with current information, and how outdated data is to be deleted, must be included.
   f. Itemize and describe the tasks that are to be performed.
   g. Describe in detail all manual operations that will be required.
   h. Detail all machine requirements.
   i. Include all formula, tables, and calculations to be used.
   j. Include a description of all handling and user controls to be employed.

ECONOMIC EVALUATION SUMMARY

	DESCRIPTION	ANNUAL COSTS 1st YEAR	2nd YEAR	3rd YEAR
PRESENT SYSTEM	NON-ADP SALARY AND RELATED COSTS			
	NON-ADP OTHER COSTS			
	ADP PROCESSING COSTS			
	ADP DEDICATED EQUIPMENT COSTS			
	ADP DATA PREPARATION COSTS			
	OTHER ADP COSTS			
	COST OF PRESENT SYSTEM			
PROPOSED SYSTEM	NON-ADP SALARY AND RELATED COSTS			
	NON-ADP OTHER COSTS			
	NON-ADP INCOME	( )	( )	( )
	ADP PROCESSING COSTS			
	ADP DEDICATED EQUIPMENT COSTS			
	ADP DATA PREPARATION COSTS			
	ADP DEVELOPMENT COSTS			
	OTHER ADP COSTS			
	COST OF PROPOSED SYSTEM			
	NET SAVINGS OR INCREASED INCOME			

FORM NO. [redacted]

GPO 641-3

Section 4 (Cont.)

k. Describe in detail how the PROPOSED System will interface with existing or proposed machine or manual systems.

5. Indicate the desired implementation schedule.
6. If a portion or subset of the PROPOSED System can be developed and implemented ahead of the entire system, describe it and relate it to the desired implementation schedule above.
7. Describe the life span of the PROPOSED System and relate it to future plans or other system developments.
8. Describe alternatives which could satisfy most or all objectives for the PROPOSED System.
9. List any constraints inherent in the PROPOSED System requirements (limitations upon which the system must depend, such as equipment required, contracts signed, and/or availability of input).
10. Describe all special equipment or services (computers, remote terminals, communications lines, contract programming, messengers, etc.) which the user knows will be required by the PROPOSED System.
11. Specify user training required to implement or operate the PROPOSED System.
12. Describe all one-time conversions of user files, numbering systems, etc., which will be required to implement the PROPOSED System.

F. Feasibility Study - Mandatory/Technical/Economic Considerations.

1. If applicable, explain the mandatory reasons for implementing the PROPOSED System.
2. Describe any known problems, technical or otherwise, affecting the feasibility of the PROPOSED System.
3. The Economic Evaluation Summary (Form No. ___) will be used as a broad comparison of Present System costs to the PROPOSED System costs. Describe in a clear and orderly manner the economic considerations that are applicable to the PROPOSED System. These economic considerations must be divided into user income savings and/or costs, and ADP Management costs and/or savings, with both being summarized to produce net income/savings and/or costs.

JOB COST ESTIMA

SYSTEM NAME _____ DSR NO. _____

ENTER MACHINES TO BE USED AND THEIR RATES, ALSO LABOR RATES AND FRINGE BENEFIT PERCENTAGE	ESTIMATED HOURS						NOTES
	LABOR		MACHINES				
TASKS — RATES →	SALARY	OTHER					
	$	$	$	$	$	$	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
TOTAL DEVELOPMENT HOURS							
TOTAL DOLLARS →	$	$	$	$	$	$	$
____ % FRINGE BENEFIT DOLLARS →	$	$	$	$	$	$	$
TOTAL DEVELOPMENT DOLLARS →	$	$	$	$	$	$	$
1. ANNUAL PRODUCTION RUN TIME							
2. ANNUAL NORMAL MAINTENANCE							Notes:
3.							
ANNUAL TOTAL HOURS →							
ANNUAL TOTAL DOLLARS →	$	$	$	$	$	$	$
____ % FRINGE BENEFIT DOLLARS →	$	$	$	$	$	$	$
KEYPUNCH CARDS, PAPER, ETC. (DOLLARS) →							$
ANNUAL TOTAL DOLLARS →	$	$	$	$	$	$	$
CURRENT TOTAL ANNUAL DOLLARS →							$
NET DIFFERENCE DOLLARS →	(NEW ANNUAL DOLLARS MINUS CURRENT ANNUAL DOLLARS)						$

FORM NO. [redacted]

GPO 841-3

Section 4 (Cont.)

4. The user must include in these economic considerations the required resources in terms of personnel, supplies, rentals, equipment, training, etc., translated to annual dollar expenditures. The user must also include, in the economic considerations, any savings or additional income that will be accrued when the PROPOSED System is implemented.
5. The ADP Project Manager must include the following in these economic considerations:
   a. A data processing flow chart illustrating volumes.
   b. Programming manpower requirements to program the system, and the related costs for salary, employee welfare, stationery, depreciation, etc.
   c. Software purchases.
   d. Machine processing requirements and the annual cost of running each program.
   e. Training requirements and costs.
   f. Annual input data preparation and control costs.
   g. Annual supply and equipment requirements and costs.
6. The Project Manager will specify the precise data processing costs on the Job Cost Estimate Form (Form No. ___). The ADP Project Manager will summarize the economic considerations on this form in order to present the economic effects of the PROPOSED System in a precise manner.

INITIATION PHASE

COST FACTORS

Section 5.

Cost Factors

Cost is a major element in determining the operating effectiveness of a system. Note, however, that costly systems are not necessarily inefficient ones. A system must not be arbitrarily discarded or rejected because it is expensive. Costly systems may well be the best ones if they are achieving their stated objectives with minimum errors.

The systems analyst must provide cost factors in a clear, concise, and standard format. Unusually high costs should be justified and explained.

System costs should be projected three years into the future. This provides a measurement of how efficiently the system will handle projected growth factors. After three years, cost estimates tend to become inaccurate or obsolete because of changes within systems.

A. Direct System Costs - These include labor rate, equipment expenses, material, supplies, and overhead.

B. Intangible Savings and/or Costs - Any costs or savings that cannot be directly attributed to a system are included in this category. They can be used to provide economic justification of a system.

   Examples of intangible benefits associated with a new system include:
   1. Improved planning.
   2. Stabilized personnel requirements.
   3. Improved inventory control.
   4. Improved product design.
   5. Standardization.

C. Cost of Design and Implementation - Within the construction of costs for the proposed system, an amount for each design and implementation cost must be included:
   1. Detailed systems design costs.
   2. Programming costs.
   3. Cost of training of other data processing personnel.
   4. Conversion and system testing costs.
   5. Cost of cut-over.

INITIATION PHASE

COST FACTORS

Section 5 (Cont.)

6. Cost of retraining Bureau personnel.
7. Cost of creating master files.

ADP PROCEDURES

DEVELOPMENT PHASE - PLANNING/DEFINITION

CHAPTER 3

DEVELOPMENT PHASE - PLANNING/DEFINITION

INTRODUCTION

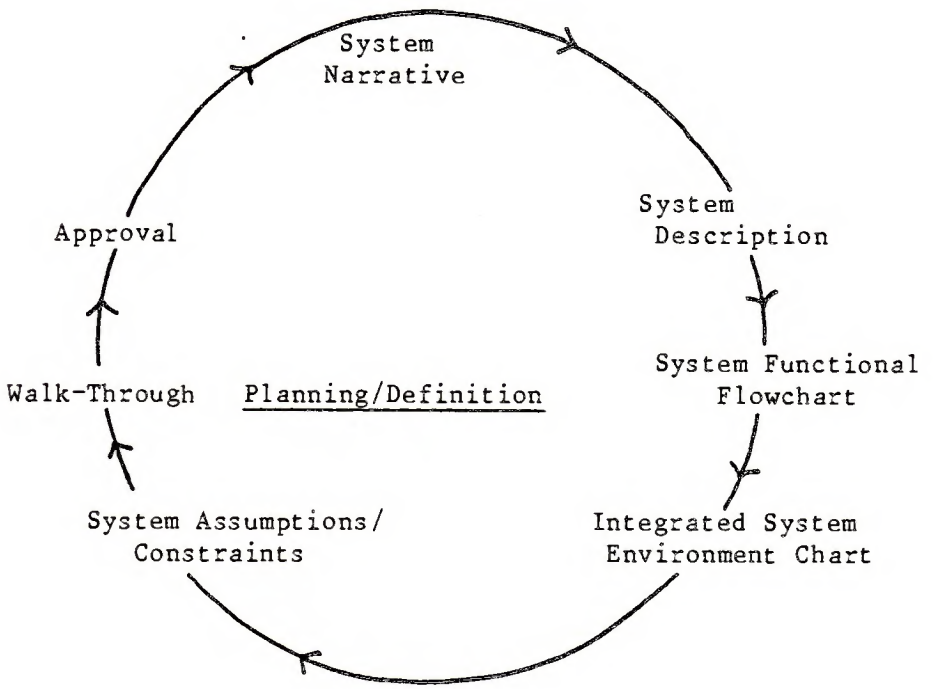
Section 0.

Introduction

During the Planning/Definition Stage of development, the functional and data requirements for the software are determined.

A. Functional Requirements. The Functional Requirements should provide a basis for the mutual understanding between users and designers of the initial definition of the software, including the requirements, operating environment, and development plan.

B. Data Requirements. The Data Requirements should provide a data description and technical information about data collection requirements.



DEVELOPMENT PHASE - PLANNING/DEFINITION

PROJECT TEAM ADMINISTRATION

Section 1.

Project Team Administration.

A. Upon completion of the Initiation Phase, the responsible project team member(s) will prepare:
   1. Written narrative which outlines the purpose, scope, and authorization of the system.
   2. Generalized functional description of the new system or major modification.
   3. Functional flowchart which graphically portrays the informational flow of the system.
   4. Integrated system environment chart.
   5. List of system assumptions and constraints.

B. Walk-Through. The members of the walk-through team will vary in accordance with the material being reviewed. The walk-through is chaired by the Project Manager and conducted by the individual responsible for the material.

   The purpose of the walk-through is to determine if all requirements for the system have been defined and to evaluate the system definition for completeness and accuracy. Review the work plan for the Design/Specification Phase during the walk-through and make adjustments to the plan and project management data as required.

   The Planning/Definition Phase must be approved by the responsible individuals and management before the Design/Specification Phase can be initialized.

SYSTEM DOCUMENTATION (A

SUBJECT

SYSTEM NAME

RESPONSIBILITY	DATE	REV. NO.	PAGE NO.

SUBJECT

SYSTEM NAME

FORM NO.

DEVELOPMENT PHASE - PLANNING/DEFINITION

SYSTEM NARRATIVE

Section 2.

System Narrative

A system narrative must be written to outline the purpose of the system; the scope in terms of functional and organizational involvement; and authorization of the system.

This narrative would be used to communicate outside the Division of ADP and to give clear intent and specific boundaries to the subsequent work of the systems analyst. All statements must be concise, but complete.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

DEVELOPMENT PHASE - PLANNING/DEFINITION

SYSTEM DESCRIPTION

Section 3.

System Description

The system description will consist of a generalized functional description of the new system or the major modification. All inputs and outputs of the system must be described in narrative form, including interface with other existing or planned systems. If this is a modification or an extension to an existing system, it should be explained fully. The narrative should be concise, orderly, and complete.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO ___).

DEVELOPMENT PHASE - PLANNING/DEFINITION

FUNCTIONAL FLOW CHART

Section 4.

Functional Flow Chart

The functional flow chart will graphically portray the informational flow of the system. All functions, processes, procedures, and organizations must be identified. Large scale systems, or significantly complex systems (or sub-systems), may require a number of flow charts constructed at various levels. The information reflected on the top level flow chart should be generalized so that it can be portrayed on a single sheet and cross-referenced to subordinate flow charts containing the system detail.

FORMS: SYSTEM DOCUMENTATION (B) (FORM NO. ___).

INTEGRATED SYSTEM ENVIRONMENT CHART

Section 5.

Integrated System Environment Chart

The integrated system environment chart for the subject system, or system segment, will show existing or proposed interface with all other manual or machine systems. The subject system should be emphasized in some manner, with the use of circles, pointers, shading, etc.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

DEVELOPMENT PHASE - PLANNING/DEFINITION

SYSTEM ASSUMPTIONS/CONSTRAINTS

Section 6.

System Assumptions/Constraints

A. Assumptions. Those conditions that cannot be supported by factual information.

B. Constraints. Circumstances or limitations upon which the system must depend.

Both areas may have a definite impact on the system from the standpoint of design, development, implementation, or operation. Include reference to schedule constraints upon inputs and outputs, identifying files/data sets, and/or recurring processing which must be performed either prior to, or as a result of, the operation of the subject system.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

ADP PROCEDURES

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

CHAPTER 4.

		Section
*	Introduction	0
*	Project Team Administration	1
*	Detailed System Description	2
*	Modular System Flow Chart	3
*	System Input Requirement	4
*	System Output Requirements	5
*	System Files/Data Sets	6
*	File Design	7
*	System Logic	8
*	System Controls	9
*	Computer Processing	10
*	Development/Implementation Schedule	11
*	Glossary of Terms/Abbreviations	12

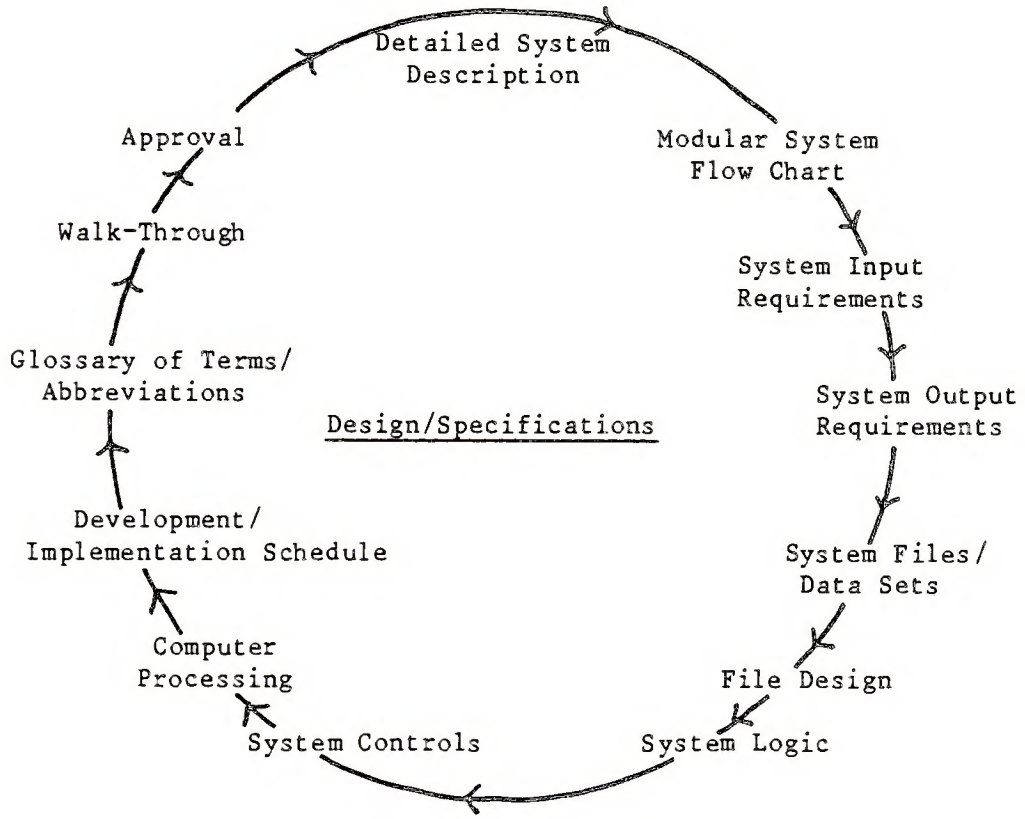
DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

INTRODUCTION

Section 0.

Introduction

During the Design/Specifications stage of development, the design alternatives, specific requirements, and functions to be performed are analyzed and a design is specified. The design specifications depict how a new system and/or modifications to existing systems will be developed and implemented.



Modular design should be used to divide the problem solution into its logical parts so that each may be analyzed and then programmed independently on a structured basis. This technique provides for considerable efficiency in programming time, computer time, and maintenance time since it enables complex problems to be segmented into many simple sections. A structured program reflects the program organization established in the system's modular flow chart.

INTRODUCTION

Section 0 (Cont.)

The primary design criteria of modular design are, ease of understanding, ease of program modification, and standardization of program construction.

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

PROJECT TEAM ADMINISTRATION

Section 1.

Project Team Administration

A. Upon completion of the Planning/Definition Phase, the responsible project team member(s) will:
   1. Prepare a detailed functional description of the new system or major modification.
   2. Prepare a detailed functional flow chart which graphically protrays the informational flow of the system.
   3. Identify and define, in detail, all input requirements.
   4. Identify and define, in detail, all output requirements.
   5. Identify and define, in detail, all system files/data sets which are generated and used internally by the system.
   6. Select file designs which permit efficient processing of information.
   7. Describe the system logic requirements.
   8. Identify and define, in detail, the control procedures used by user organizations to maintain validity of the system. Also, describe the internal processing controls required by the system.
   9. Describe and document the computer processing logic of the system.
   10. Indicate due dates for system implementation, data input, and data output.
   11. Provide a list of technical terms, words, phrases, and abbreviations which require further explanation and definition.

B. Walk-Through. The members of the walk-through team will vary in accordance with the material being reviewed. The walk-through is chaired by the Project Manager and conducted by the individual responsible for the material.

   The purpose of the walk-through is to determine if all design requirements for the system have been defined and to evaluate the design specifications for completeness and accuracy. Review the work plan for the Programming Phase during the walk-through and make adjustments to the plan and project management data as required.

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

PROJECT TEAM ADMINISTRATION

Section 1 (Cont.)

The Design/Specifications Phase must be approved by the responsible individuals and management before the Programming Phase can be initialized.

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

DETAILED SYSTEM DESCRIPTION

Section 2.

Detailed System Description

The Detailed System Description will expand the general description of the system which was developed in the Planning/Definition Phase, and will consist of an in-depth functional narrative of the new system or the major modification. All inputs and outputs of the system must be described in detail, including interface with other existing or planned systems. If this is a modification or extension to an existing system, it should be explained fully. The narrative should be concise, orderly, and complete.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

MODULAR SYSTEM FLOW CHART

Section 3.

Modular System Flow Chart

The Modular System Flow Chart will expand the functional flow chart which was developed in the Planning/Definition Phase, and will graphically portray the details of all functions, processes, procedures, and organizations of the system. Large-scale systems, or significantly complex systems (or sub-systems), may require a number of flow charts constructed at various levels. The information reflected on the top level flow chart should be generalized so that it can be portrayed on a single sheet and cross-referenced to subordinate flow charts containing the system detail.

FORMS: SYSTEM DOCUMENTATION (B) (FORM NO. ___).

SYSTEM INPUT REQUIREMENTS

Section 4.

System Input Requirements

"Inputs" are defined as: (1) source documents or transmittals, (2) punched cards, (3) paper tape, (4) remote terminal device messages, and (5) data sets/files resident on magnetic tape/disk, which are entered as input to the system from an interfacing system. Data Sets/Files generated and utilized internally by the system are described in Section 6 of this chapter.

A. Guidelines for Designing Input.
   1. Arrange (sequence) input data in a logical pattern to facilitate the user's preparation of input from forms or original source.
   2. Establish complete requirements for one-time input of all data required to sustain all computer processes dependent on the input.
   3. Insure that data required for an input action does not unnecessarily duplicate data in other input records.
   4. Provide clear and complete instructions for gathering, preparing, and submitting input data records or files.
   5. Arrange input data collection to insure that standard codes, or meaningful mnemonics if possible, are used to the maximum possible.
   6. Design input requirements so that personnel preparing the input do so as part of their primary work function to the maximum extent possible.
   7. Design all man/machine dialogues to be as brief and understandable as possible, and to require minimum interpretation on the part of the user.
   8. Use clear text, where possible, in all man/machine dialogues.

B. General Description of System Inputs. Describe each input medium as to its purpose, function, and relationship to the system. Each description should contain sufficient detail in order to clearly indicate its intended application.

   FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

C. Preparation, Control, and Transmission Criteria. Describe in detail, for each type input, the:
   1. Organizational responsibility.
   2. Schedule.

SYSTEM COMPONENTS IDENTIFICATIO

SYSTEM NAME	COMPONENT CLASS

ITEM NO.	TITLE	REFERENCE PAGE

RESPONSIBILITY	DATE	REV. NO.	PAGE NO.

FORM NO.

GPO 841-

INPUT REQUIREMENT

SYSTEM NAME			ITEM NO.
INPUT TITLE			MEDIUM
SOURCE DOCUMENT NAME	SOURCE	LENGTH	
FREQUENCY			
EST. VOLUME	MACHINE TYPE	VERIFY	

GENERAL INSTRUCTIONS:

CARDS/RECORD/MESSAGE TYPES

ITEM NO.	RECORD NAME	SPECIAL INSTRUCTIONS	REFERENCE PAGE

RESPONSIBILITY	DATE	REV. NO.	PAGE NO.

GPO 841

Section 4 (Cont.)

3. Manner of preparation.
4. Unique encoding criteria or instructions.
5. Pre-edits/controls.
6. Batching - cut off points/routing.
7. Transmission of source documents.

Documentation for inputs entered over remote terminals should include input locations, station code numbers, and entry schedules.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

D. System Components Identification (Input). Identify and index all inputs to the system, which are generated by an interfacing system. Exclude data sets or files generated and utilized internally by the system.

Instructions for the completion of the System Components Identification Form (Form No.) are:

1. System Name - Enter the official name assigned to the system.
2. Component Class - Enter the word INPUT to establish that the items listed are inputs to the system.
3. Item Number - Enter the identification number of the input, which will uniquely identify the specific Source Document, Transmittal, Data Set, etc., indicated in the adjacent title block.
4. Title - Enter the official name assigned to the respective Source Document, Transmittal, Data Set, etc.
5. Reference Page - Enter the subsequent page numbers, wherein further detail regarding the specific input is indicated; i.e., Input Requirements Forms (Form No.).

E. Input Requirements. Identify and describe each type of input listed on the System Components Identification Form. The Input Requirements Form will be used to provide the pertinent information regarding each input.

Instructions for the completion of the Input Requirements Form (Form No.) are:

SYSTEM INPUT REQUIREMENTS

Section 4 (Cont.)

1. System Name - Enter the official name of the system. This name must correspond to the system name previously assigned on the System Components Identification Form.
2. Item Number - Enter the identification number that has been assigned to the specific input. This number must correspond to the item number previously assigned on the System Components Identification Form.
3. Input Title - Enter the assigned title of the subject Source Document, Transmittal, Data Set, etc. This identifying name must correspond to the title previously indicated on the System Components Identification Form.
4. Medium - Indicate the type of vehicle/mode applicable to subject input; i.e., card, tape, terminal, etc.
5. Source Document Name - Enter the name of the originating source document.
6. Source - Enter the originating activity, abbreviated name, or number that has been assigned responsibility for providing subject information.
7. Length - Indicate whether the informational requirements, as specified herein, are Variable or Fixed.
8. Frequency - Enter the input frequency established as required for the input; i.e., Daily, Weekly, Monthly, etc.
9. Estimated Volume - Enter the number of Source Documents, Transmittals, and/or Data Sets that may be expected, based on the aforementioned frequency.
10. Machine Type - Enter the appropriate identification number of the input generating device for the subject information; i.e., 029, 129, 1810, CMC1800, CRT, etc.
11. Verify - Indicate whether or not verification of the informational requirement is essential.
12. General Instructions - Enter any additional instructions or criteria required; i.e., sequencing, unique keypunch or terminal operator instructions, disposition and control of source documents, procedural references, etc.
13. Card/Record/Message/Types - The following information will be provided for each input Record, Message, or Data Set.

RECORD/MESSAGE FORMA

SYSTEM NAME			COMPONENT CLASS
ITEM NO.	NAME	LENGTH	REFERENCE PAGE

ITEM NO.	FIELD NAME	FORMAT	FROM	TO	REQUIREMENTS

RESPONSIBILITY	DATE	REV. NO.	PAGE NO.

FORM NO. [illegible]

GPO 841

Section 4 (Cont.)

14. Item Number - This number is an extension of the basic item number provided in the upper right hand corner of this form. This item number is developed by adding a numeric designation, in ascending order, to the basic item number.
15. Record Name - Enter the name that will be used to identify the specific Record, Message, and Data Set input.
16. Special Instructions - Enter the reference page number of subsequent pages wherein further details concerning the input record, message, and/or data set are specified. Only those pages indicating the next lower level of detail should be referenced using the Record/Message Format Form (Form No.).

F. Record/Message Format (Input). Describe in detail each type of input listed in the "Cards/Record/Message Types" area of the Input Requirements Form. The Record/Message Format Form will be used to provide the detailed format for each input.

Instructions for the completion of the Record/Message Format Form (Form No.) are:

1. System Name - Enter the official name of the system. This name must correspond to the system name previously assigned on the Input Requirements Form.
2. Component Class - Enter the word INPUT to indicate that listed details apply to input requirements.
3. Item Number - Enter the item number assigned to identify this specific input. This number must correspond to the item number previously assigned on the Input Requirements Form.
4. Name - Enter the assigned Card, Record, or Message name corresponding to the record name previously assigned to the input on the Input Requirements Form.
5. Length - Enter the maximum number of characters that may be contained within this Card, Record, or Message. Any special and/or unique conditions should be indicated in the requirements blocks.
6. Reference Page - Enter the page number of the sample Input Document.

Section 4 (Cont.)

7. Item Number - Enter a numeric designation (in ascending order) that will identify each specific data element (field name). This item number is a further extension of the item number described above.
8. Field Name - Enter the word, phrase, or term used to identify the data element.
9. Format - Enter the specified characteristics that have been established for the data element. For purposes of this specification, indicate whether the contents of the data element field are alpha, numeric, or alpha-numeric; i.e., A, N, A/N. Also, indicate the maximum number of characters (in parentheses) that may be specified for this data element field; i.e., (1), (15), (100), etc.
10. From/To - Enter the columnar positions allocated, assigned, or required by the data element field. The From/To requirements, which denote the size of the input data element field, must be compatible with the contents indicated in the format block above.
11. Requirements - Describe any peculiarities, unique conditions, circumstances, instructions, criteria, relationships, and references regarding the data element.

G. Input Samples. Compile a sample of each Source Document, Transmittal, or Card, which generates input for system entry. Each sample should be an actual document or a copy of an actual document.

Inputs such as magnetic tape/disk, paper tape, and on-line transmissions must also be shown here. It is suggested that representative data be inserted for each input.

H. Request for Key Entry Services. Complete the Request for Key Entry Services Form (Form No.), and forward to the individual responsible for the Key Entry Service for review and approval.

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

SYSTEM OUTPUT REQUIREMENTS

Section 5.

System Output Requirements

Identify and define, in detail, all output requirements for the system or major modification. "Outputs" are defined as: (1) printed reports, (2) punched cards, (3) visual display, (4) audio responses, (5) magnetic tape/disk, and (6) paper tape which support an interfacing system. Data sets/files generated and utilized internally by the system are described in Section 6 of this Chapter.

A. Guidelines for Designing Output.

1. Design output products for ease of use -
   a. Output products should be clearly identified.
   b. Plotter products should be clearly identified.
   c. Products on hard copy should have space for notes, marks, etc., as required by the user.
   d. Tabular reports should have clearly defined columns and rows. If figures and crossfooting are involved, they should be easily followed.
   e. CRT displays should be designed to be readily identifiable, readable, and accessible.
2. Design the contents of output products to be selfstanding to the maximum extent with minimum reliance on codes. If codes must be used, they should be standard codes for standard data elements.
3. Plan the preparation of output products to clearly show the dates prepared and the date(s) or period(s) for which the contents are valid, or the date of the file(s) from which the data was taken.
4. Review for content all reports, graphs, and displays to avoid unnecessary duplication with other reports or displays.
5. Design products containing related elements of information so that the elements have a logical grouping sequence.
6. Develop outputs which are to be machine-used in sequences, formats, codes, and character sets which facilitate subsequent processing of the data.
7. Consider the output/medium/product, the mode of transmission, and the user's purposes. Apply logic and consult with the user in designing what he will receive to do his job.

SYSTEM COMPONENTS IDENTIFICATIO

SYSTEM NAME	COMPONENT CLASS

ITEM NO.	TITLE	REFERENCE PAGE

RESPONSIBILITY	DATE	REV. NO.	PAGE NO

Section 5 (Cont.)

8. When an individual is interacting with a file, such as in the payroll area, the CRT displays should provide legibility and ease of interaction, display, input, and correction.
9. Design error/reject messages to inform the user of correction procedures insofar as possible.

B. General Description of System Outputs. Describe each output product as to its purpose, function, and its relationship to other output products or to other interfacing systems which it supports. Each description should contain sufficient detail that will clearly indicate the intended application.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

C. Output Control and Distribution. Describe, in detail, for each type output, the:
1. Control Requirements.
2. Frequency.
3. Form Paper.
4. Distribution.
5. Forwarding Instructions.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

D. System Components Identification (Output). Identify all system outputs which support an interfacing system. Exclude data sets/files generated and utilized internally by the system.

Instructions for completing the System Components Identification Form (FORM NO. ___) are:
1. System Name - Enter the official name assigned to the system.
2. Component Class - Enter the word OUTPUT to indicate that items listed are system outputs.
3. Item Number - Enter the identification number of the output, which will uniquely identify the specific report, card, tape, etc., indicated in the adjacent title block.
4. Title - Enter the official name assigned to the specific report, card, tape, etc.

OUTPUT REQUIREMENTS

SYSTEM NAME			ITEM NO.
OUTPUT TITLE			MEDIUM
FORM TYPE	FORM SIZE	NO. OF PARTS	LINES/INCH
FREQUENCY			

RECORD/MESSAGE TYPES

ITEM NO.	PAGES WHERE PRESENT	LINE NUMBER WHEN PRESENT	RECORD NAME	LINES SKIPPED BEFORE PRINT	REFERENCE PAGE

REPORT SEQUENCE AND CONTROL

MAJOR TO MINOR	FIELD NAME	CONTROL ACTIONS
1.		
2.		
3.		
4.		
5.		

GENERAL INSTRUCTIONS:

RESPONSIBILITY	DATE	REV. NO.	PAGE NO.

FORM NO. [redacted] GPO 841-

Section 5 (Cont.)

5. Reference Page - Enter the subsequent page numbers wherein further details regarding this specific output are described. Only those page(s) concerned with the next lower level of detail should be referenced: i.e., Output Requirements form. (FORM NO. ___).

E. Output Requirements. Identify and describe each type output listed on the System Components Identification Form. The Output Requirements Form will be used to provide the pertinent information regarding each output.

Instructions for the completion of the Output Requirements Form (FORM NO. ___) are:

1. System Name - Enter the official name of the system. This name must correspond to the system name previously assigned on the System Components Identification Form.
2. Item Number - Enter the identification number assigned to the specific output. This number must correspond to the item number previously assigned on the System Components Identification Form.
3. Output Title - Enter the assigned title of the subject report, card, message, response, etc. This identifying name must correspond to the title previously indicated on the System Components Identification Form.
4. Medium - Indicate the type of vehicle/mode applicable to subject output; i.e., printed report, card, visual display, audio response, etc.
5. Form Type - Enter the form requirements for the output; i.e., color, weight, Xerox, etc.
6. Form Size - Enter the dimensional requirements for the output; ie., 8 x 11, 11 x 17, etc.
7. Number of Parts - Enter the number of copies that are to be generated by the system/program.
8. Lines/Inch - Enter the lines per inch requirements of the output, if applicable.
9. Frequency - Enter the frequency or time interval in which output will be generated; i.e., daily, weekly, monthly, etc.
10. Record/Message Types - The following information will be provided for each output record or message. Note: It is not necessary to include descriptions of literals which appear in printed report headings. These may be obtained from the form layouts.

Section 5 (Cont.)

12. Item Number - This number is an extension of the basic item number provided in the upper right hand corner of this form. This item number is developed by adding a numeric designator in ascending order, to the basic item number.
13. Pages Where Present - Enter the affected pages of the output in which the record or message will appear; i.e., All, 1, 2, etc.
14. Line Number When Present - Enter the line numbers of the page in which the record or message will appear; i.e., 2, 2 and 4, 2-54, etc.
15. Record Name - Enter the name assigned to identify the record or message; i.e., Report Title Line, Report Header, Detail (1), etc.
16. Lines Skipped Before Print - Enter the applicable number of lines to be skipped from the last printed line. Leave blank if not applicable, or if skipping of lines is not required.
17. Reference Page - Enter the reference page number of subsequent pages in which further details concerning the record or message are described. Only those pages indicating the next lower level of detail should be referenced using the Record/Message Format Form (FORM NO. ___).
18. Report Sequence and Control - The following sequence and control type information should be provided for each identified output.
19. Field Name - Enter in descending order (major to minor) the data elements used in sequencing the applicable output.
20. Control Actions - Enter all unique or special control actions/conditions that affect or pertain to the output.
21. General Instructions - Enter any additional instructions that should be considered or required by the system output.

F. Record/Message Format (Output). Describe, in detail, each type of output listed in the "Record/Message Types" area of the Output Requirements Form. The Record/Message Format Form will be used to provide the detailed format for each output.

RECORD/MESSAGE FORMA

SYSTEM NAME			COMPONENT CLASS
ITEM NO.	NAME	LENGTH	REFERENCE PAGE

ITEM NO.	FIELD NAME	FORMAT	FROM	TO	REQUIREMENTS

RESPONSIBILITY	DATE	REV. NO.	PAGE NO.

Section 5 (Cont.)

Instructions for the completion of the Record/Message Format Form (FORM NO. ___) are:

1. System Name - Enter the official name of the system. This name must correspond to the system name previously assigned on the Output Requirements Form.
2. Component Class - Enter the word OUTPUT to indicate that listed items apply to some output requirement.
3. Item Number - Enter the item number assigned to identify this specific output. This number must correspond to the item number previously assigned on the Output Requirements Form.
4. Name - Enter the assigned record or message name corresponding to the record name previously assigned on the Output Requirements Form.
5. Length - Enter the maximum number of characters that will be required and generated for this record or message. Any special or unique condition should be indicated in the requirements blocks.
6. Reference Page - Enter the page number of the sample Output Document.
7. Item Number - Enter a numeric designator (in ascending order) to identify and distinguish each specific data element (field name). This item number is a further extension of the item number described above.
8. Field Name - Enter the word, phrase, or term assigned to identify the data element.
9. Format - Enter the specific characteristics that have been established for the data element. For purposes of this specification, entries will be noted as alpha, numeric, or alphanumeric, i.e., A, N, A/N. Also indicate the maximum number of characters, in parentheses, that may be used for the data element field; i.e., (1), (15), (100), etc.
10. From/To - Enter the columnar positions allocated, assigned, or required by the data element field. The From/To requirement, which denotes the size of the output data element field, must be compatible with the contents indicated in the format block above.
11. Requirements - Describe any peculiarities, unique conditions, circumstances, instructions, criteria, relationships, or references regarding the data element.

Section 5 (Cont.)

G. Report Page Heading. Unless system requirements specify otherwise, all reports produced that are printed on other than preprinted forms will display the following page heading information:
   1. Bureau Name - The Bureau receiving the report.
      a. Division Name - The Division within the Bureau that utilizes the report.
      b. Report Identification - The report ID that uniquely identifies the report (program ID, etc.).
   2. Report Title - The purpose or function of the report.
   3. Page Number - The report page number in ascending sequence.
   4. Run Date (MMDDYY) - The date report was produced on the computer.
   5. Run Time (HHMM) - The time of day report was produced on the computer.
   6. Report Day (MM/DD/YY) - The cutoff, month end, payroll period, etc., date that is associated with the report.

H. Report Design Considerations.
   1. Cost and Time Savings. When designing large reports, especially those for only occasional references, every effort should be made to conserve print time, paper, and storage. One might consider these possibilities:
      a. Can it be single spaced?
      b. Can fewer print lines per report entry be used?
      c. Can it be printed two-up, three-up?
      d. Would microfilm or fiche be more practical?
      e. Would copies be best for:
         1) Customer use?
         2) Cost justification?
         3) Operation considerations?
   2. Custom Forms. Reports to be printed on preprinted forms must contain format records to assist the operator in aligning the form.
   3. Notification of "No Report". When any regularly scheduled report is not generated on a given processing cycle, the report program should cause one page with headers to be printed with the message "no report this cycle".

Section 5 (Cont.)

4. Microfilm and Fiche. For many high volume applications, microfilm or fiche can be an efficient output medium. The designer must consider storage and retention requirements, type and frequency of reference, requirement and availability of various types of viewing and retrieval equipment, indexing methods, reduction factors, etc.

   The beginning and ending control numbers on a reel of microfilm may be adequate access information for some applications while others will require rather sophisticated indexing methods and specialized retrieval equipment, possibly with hard copy capability. A header which is visible in the storage folder is recommended for all microfiche. This header should show at least the beginning control number on that fiche and date or cycle number. One frame of the fiche might also be used as the matrix index for the contents of that fiche.

   Although frequently requested by users, the expense of producing a report and film or fiche of that report can seldom be justified. In those cases where both are required, it may be cheaper to film the printed output if the print tape cannot be used for both purposes and a separate microfilm tape would have to be produced.

   Utilization of a form flash can often make film or fiche easier to use, especially when a great deal of information is being recorded for each entry. A "form flash" is a custom form image either on a glass or on film, reduced by the same factors as the microfilm. This image is superimposed on the microfilm. A form flash is recommended if hard copy of certain frames will be sent to outside sources.

   Reports which are suitable for representation as two-up on film need not necessarily be generated as two-up on tape. Each page or document can be individually generated with a frame advance as the control character for the last record of the page or document if a hardware feature is available on the microfilm unit which can be used to record two images per frame. A single image form flash can be used.

DSC 1265-41
(APRIL 1981)

UNITED STATES DEPARTMENT OF THE INTERIOR — BUREAU OF LAND MANAGEMENT

PAGE _____ OF _____

REPORT LAYOUT FORM

SYSTEM _____ PROGRAM _____ PREPARED BY _____ DATE _____

REPORT SEQUENCE: LEVEL 1 LEVEL 2 LEVEL 3 LEVEL 4 LEVEL 5

GPO 831-097

	1	2	3	4	5	6	7	8	9	10	11	12	13
	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890 12
1	DATE				U.S. DEPT OF INTERIOR-BUREAU OF LAND MANAGEMENT							PAGE	
2												PCN	
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													

63a

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

SYSTEM OUTPUT REQUIREMENTS

Section 5 (Cont.)

I. Output Samples. Compile samples of the output to be generated by the system; i.e., printed reports, punched cards, magnetic tape/disk, paper tape, visual displays, audio responses, etc.

Include a sample of each preprinted form used in the system. If new forms are required for the new system, include a sample of each form, drawn and lettered to scale. Underscore or otherwise indicate items of text that are preprinted to distinguish them from the computer data output. Use sample data on all forms.

Output that is not printed on preprinted forms must be drawn on the Report Layout Form (DSC 1265-~~1~~4), indicating the print format required. Include sample data on the report.

Prepare typewritten samples of Terminal Typewriter/Printer/CRT output. Indicate the maximum text width in characters, and text depth in lines. Use forms or facsimile copies, if applicable.

Prepare layouts of interfacing tape/disk supporting other systems.

For Datacom applications refer to "Data Communciations" section of this manual.

RECORD/MESSAGE FORMA

SYSTEM NAME			COMPONENT CLASS
ITEM NO.	NAME	LENGTH	REFERENCE PAGE

ITEM NO.	FIELD NAME	FORMAT	FROM	TO	REQUIREMENTS

RESPONSIBILITY	DATE	REV. NO.	PAGE NO.

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

SYSTEM FILES/DATA SETS

Section 6.

System Files/Data Sets.

Identify and define, in detail, all Files/Data Sets resident on magnetic tape/disk, which are generated and utilized internally by the system.

A. General Description of Files/Data Sets. Describe each internal output file/data set with respect to purpose, function, and relationship to other system output. Each description should contain sufficient detail so that it clearly indicates the intended application.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

B. Files/Data Sets Identification. Identify and index all files and data sets generated for internal use by the system.

Instructions for the completion of the System Components Identification Form (FORM NO. ___) are:

1. System Name - Enter the official name assigned to the system.
2. Component Class - Enter the words SYSTEM FILES to indicate that these files/data sets are internal to the system.
3. Item Number - Enter the system identification number of the file/data set.
4. Title - Enter the official name assigned to the file, data set, etc.
5. Reference Page - Enter the subsequent page numbers where further detail regarding the specific internal output is provided; i.e., Record/Message Format Form (FORM NO. ___).

C. Record/Message Format (Internal). Describe in detail each type output listed on the System Components Identification Form. The Record/Message Format Form will be used to provide the detailed format for each output.

Instructions for the completion of the Record/Message Format Form (FORM NO. ___) are:

Section 6 (Cont.)

1. System Name - Enter the official name of the system. This name must correspond to the system name previously assigned on the System Components Identification Form.
2. Component Class - Enter the words SYSTEM FILES to indicate that listed details apply to an internal file/data set.
3. Item Number - Enter the item number assigned to identify this specific output. This number must correspond to the item number previously assigned on the System Components Identification Form.
4. Name - Enter the assigned file/data set name previously assigned on the System Components Identification Form. Also enter, in parenthesis, the name of the record or message within the file/data set that is described in detail.
5. Length - Enter the maximum number of characters that will be required and generated for this record or message. Any special and/or unique condition should be indicated in the requirements blocks.
6. Reference Page - Provide cross-references to subsequent pages which contain this specific output Record or Card Layout Form.
   a. For each type output, its Record or Card Layout Form should immediately follow the respective Record/Message Format Form.
7. Item Number - Enter a numeric designator (in ascending order) that will identify each specific data element (field name) within the record or message. This item number is a further extension of the item number described in the paragraph above.
8. Field Name - Enter the word, phrase, or term used to identify the data element.
9. Format - Enter the specific characteristics that have been established for the data element. For purposes of this specification, entries will be noted as alpha, numeric, or alphanumeric, i.e., A, N, or A/N. Also indicate the maximum number of characters, in parentheses, contained in the data element field; i.e., (1), (15), (100), etc.
10. From/To - Enter the columnar positions assigned to the data element field. The From/To span must be compatible with the contents indicated in the adjacent format block.

Section 6 (Cont.)

11. Requirements - Describe any peculiarities, unique conditions, relationships, criteria, etc., of the data element.

Prepare, for each record/message format the appropriate record layout.

FILE DESIGN

Section 7.

File Design

A. Introduction. A file is a logical grouping of data elements in a physical medium which provides for efficient processing of information. Any system can operate only as efficiently as the file construction permits. It is therefore essential to maintain a controlled sequence of procedures during file design. The thorough research accomplished through such procedures will result in informed decisions during the selection phase.

While the use of controlled design procedures requires more effort than haphazard matching and selection, the benefits will be evident in:

1. Less storage space required.
2. More timely inquiry response.
3. Faster access.
4. Easier maintenance.
5. Better mobility.
6. Less data redundancy.
7. Improved communications with the user.

Since the success or failure of any system is measured in these terms, as well as whether or not it produces the desired output, it is necessary to design the files by a process that considers all of these factors.

1. Requirements Definition. The first step is the definition of the requirements for the system. This is done by considering the following:
   a. The input requirements should be thoroughly analyzed and classified.
   b. The relationships of all data and data elements must be established, including data dependencies and validation criteria.
   c. Security requirements must be identified.
   d. The processing needs must be detailed to include the following:
      1) Volume.
      2) Frequency.
      3) File percentages to be accessed at only one point in time or during any one update.
      4) Sequence of input.
      5) Inquiry and response requirements.
      6) Turnaround times.

Section 7 (Cont.)

e. Relationships and dependencies between data elements must be determined and documented.
f. Output requirements must be defined and described. These should consider:
   1) Volume.
   2) Frequency.
   3) Format.
   4) Sequence.

2. Data Definition The next step is to define all aspects of the data. Each data element should be thoroughly understood and documented. This documentation should include the following:
   a. A full description of the data elements.
   b. Details regarding the use and purpose of the data. This should show whether the data is used in a calculation, is a form of identification, is a key element used for inquiry, or if the data is used in conjunction with other data as a grouping device.
   c. The originator of each data element must be determined and documented.
   d. The ultimate destination of the data elements must be determined and documented.

3. Other Design Considerations. When all information regarding the data and requirements has been gathered and documented, it is then necessary to consider other factors that will play a part in the file design. These factors are generally more intangible than the previously discussed items but are important to the success of the system.
   a. Flexibility. The possible growth of the file both in relation to volume and the addition of new elements must be established.
   b. Ease of maintenance. Any file that requires maintenance as opposed to remaining in a static condition should have ease of maintenance as a consideration.

Section 7 (Cont.)

c. Transportability. Unless there are essential overriding considerations, all files should be provided with maximum transportability. Major systems are expensive both in monetary value and effort. With this in mind, it should be remembered that a good system should outlive the hardware on which it is initially installed, and should be readily adaptable to new equipment.

d. Hardware/Software Restrictions. As far as possible, hardware dependencies should be avoided and software dependencies should be minimized. These should be used only when the benefit is sufficiently great that it becomes an overriding consideration. This will provide for easier maintenance when new software is installed, and faster, easier conversion to new hardware and the accompanying software.

e. Priorities. Any given system may have requirements for a mixture of accesses and ordering. Priorities of need must be established in order to determine the final organization of the file. For example, if a given file has requirements for a large number of inquiries daily and a monthly ordered report, then the file should be designed to facilitate the inquiries. In other words, the final file organization and design should accommodate the major use of the file contents.

f. Field Definition. Each field within the file should be created for unique contents. No field should ever be used to contain different types of information under varying circumstances. Each data element requires its own unique specified location within the file, and should be constant in its meaning.

C. Access Methods. The next step in file design is to consider access methods and their applicability to the data.

1. Sequential Access. Sequential access is applicable to files that are arranged in a given set sequence, and which are processed entirely, or nearly entirely, each time the file is accessed.

Section 7 (Cont.)

2. Random Access. Random access is best suited to large files which have limited access requirements and/or where processing does not require any specific sequence. Access is by means of a key.
3. Direct Access. Direct access is efficient where large quantities of data exist with only a minimum number of records accessed at any given point in time. A key must be developed which is entirely unique to that record and the key becomes the input to an algorithm for calculation of the actual address.

D. File Types and Criteria. There are several types of files, each appropriate for a given set of requirements or application. Each of these should be considered in light of their inherent strengths and weaknesses, their applicability to the requirements, and the operational overhead in making a file-type selection.

1. Data Base. A data base provides the means to connect data elements in such a manner that it is possible to selectively access one or more elements while simultaneously eliminating data redundancy and I/O processing of elements that are irrelevant to the task at hand.

   A data base file is indicated when the following requirements exist:

   a. Many or complex relationships between data elements.
   b. Varied access requirements.
   c. Access to only some of the data elements at any one point in time.
   d. Diverse processing requirements.
   e. Numerous users with varied requirements, each of which has a different relational requirement between data elements.

   A Data Base Management System (DBMS) provides for efficient processing when the above mentioned conditions exist; however, it is less efficient and more costly when these do not exist.

Section 7 (Cont.)

The overhead for a DBMS is usually considerable. For this reason, any person involved in file design should make a determined effort to ascertain if the needs warrant the use of DBMS.

2. Flat Files. Flat files are normal tape and disk files. The data in a flat file is self-contained, and rarely is processed in conjunction with data that is not a part of the file itself; or data in another file which has a complex or varied relationship to the file. These are best suited where the following requirements exist:
   a. One or two types of access.
   b. Simple relationships between data elements.
   c. Full file or near full file processing at each file access.
   d. Uncomplicated processing requirements.
   e. Small or relatively small amounts of data.

   Flat files are effective for files which have a relatively small amount of data with definitive relationships that may be accessed on a random or direct basis in a more or less regular mode.

   They are inefficient for files in which the data element relationships are many, selective, and complex, or where a variety of accesses are required.

3. Clusters. An application technique that should be considered is the file cluster. A file cluster is a normal first step in the direction of distributed data processing and is simply a logical relationship between files which are connected by means of an application accessing the members of the cluster. File clusters may be either clusters of data bases, or clusters of flat files; and can be arranged for either similar or diverse file types.
   a. Similar File Types. A file cluster consisting of similar file types is the more common cluster. This consists of multiple files with data accessed individually by various applications, and in addition, one or more applications that have a need for simultaneous access and relational processing of the files in the cluster. An example would be a cluster of payroll, personnel, and EEO statistics.

Section 7 (Cont.)

b. Diverse File Types. Clusters of diverse file types are less common, but are, at times, the most feasible method for solving some given problems. This occurs where some application requires access to, and relational processing of, several files that would not normally be connected in other applications. When this occurs, the creation of a file cluster is indicated. An example of this might be a cluster consisting of a personnel file, a budget file, and an expense file.

The cluster is a means, therefore, of creating and documenting a relationship between files that would not, in other circumstances, have such a connection.

E. Selection. Once all data has been accumulated regarding the required characteristics, and the characteristics of the available methods, the next step is to match the two and select the most appropriate method.

1. Matching Requirements and Methods. Seldom, if ever, is a perfect match found between required and available characteristics. It is therefore necessary to make sacrifices and compromises to arrive at the most feasible approach. However, any sacrifices must be the result of careful evaluation and deliberate selection. The selection process, while relying heavily upon documented data, also requires a certain amount of reliance upon factors that may be intangible. This need not become a major stumbling block if the initial research has been thorough. Thorough research will result in sufficient knowledge of the requirements and the user operations to enable more sound judgments to be made regarding trade-offs and long range benefits.

Selection should be a painstaking process of careful matching of the required characteristics to the available characteristics. All of the information gathered during the research phase is carefully considered. When the selection is made, a small amount of data should be generated to test the validity of the selection. This constitutes the working model described in the introduction.

FILE ABSTRAC

FILE NAME _____

FILE MEDIUM AND CODE _____

FILE ORGANIZATION _____

RECORD SEQUENCE _____

HEADER LABEL _____ TRAILER LABEL _____

RECORD TYPE _____ MAXIMUM LENGTH _____

BLOCKING FACTOR _____ MAXIMUM SIZE _____

UPDATE CYCLE _____

FILE SECURITY CLASSIFICATION _____

CURRENT VOLUME _____ GROWTH _____

RETENTION CHARACTERISTICS _____

REMARKS _____

GPO 841-

FORM NO.

1260-8
981

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DATA DICTIONARY UPDATE
BASIC DATA

DE & DED RECORDS
UPDATE FORM

DATA ELEM-NO (8801) 2 3 4 5 6

ACTION-CODE (8890) (A-ADD/C-CHANGE/D-DELETE

REC-ID (8831) (4)

(COBOL, REX, QRP/PLP) DATA ELEMENT MNEMONIC (8802) (14)

(FORTRAN, BASIC) MNEMONIC (8828) (6)

CODE INDICATOR (8807) (D-STANDARD CODE/N-NOT APPL/O-OPERATIONAL/X-EXTENDED CODE) (S-STANDARD RESTRICTED/E-EXTENDED RESTRICTED)

LEVEL INDICATOR (8809) (E-ELEMENTARY/G-GROUP)

CHANGE DATE YYMMDD (8810) (6)

DE 1

DATA ELEMENT TITLE (8803) (65)

DATE ORIGIN (8814)

PRIMARY APL (8850)

DE 2

SIZE (8804) (3)

PICTURE CLAUSE (8805) (15)

CHAR REPRESENTATION (8808) (A-ALPHABETIC/N-NUMERIC/X-ALPHANUMERIC)

FORTRAN, BASIC FORMAT (8911) (6)

DECIMAL ALIGNMENT (8811) (2)

USAGE (8813) (2)

SCHEMA REPRESENTATION CLAUSE (8821) (15)

DE 3

(8818) LINE KEY

DESCRIPTION (8819)

ENTRY (DEFINITIONS, REFERENCES, COMPUTATIONS, EDITS, ASSOCIATIONS, MISCELLANEOUS) (70)

DED

DED

DED

DED

DED

DED

DED

DED

DED

73b

GPO 830-746

80 COLUMN LAYOUT SHEET

137c

GPO 855-069

DSC 1260-9 (August 1978)

DSC 1260-8b
May 1981

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DATA DICTIONARY UPDATE
CODES (8 CHAR OR LESS)

DEC & DECE
RECORDS
UPDATE FORM

DATA ELEM-NO (8801)	2	3	4	5	6

REC-ID (8831)	7	8	9	10
	D	E	C	

ACTION-CODE (A-ADD C-CHANGE D-DELETE) (8890)

CODE (8822) (ARGUMENT) (8)

CODE NAME (8823) (FUNCTION) (24)

LINE-KEY (8826)

CODE EXPLANATION LINE (8827) (40)

1 | 11 12 13 14 15 16 17 18 | 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 | 43 44 | 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84

73c

GPO 831-275

DSC 1260-8c
May 1981

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DATA DICTIONARY UPDATE
OTHER USER ATTACH/DETACH

DAAC RECORDS
UPDATE FORM

DATA ELEMENT NO. (8801) OR (8850) APPLICATION NO.	2	3	4	5	6

REC-ID (8831)	7	8	9	10
	D	A	C	

ACTION-CODE (A-ATTACH, D-DETACH)
(8890)

DATA ELEMENT NUMBER OR
APPLICATION NUMBER (ONLY THOSE IN APPLICATION TABLE ARE VALID)

(ENTER UP TO 18 PER LINE LEFT JUSTIFIED)

TRNS-SUB-CD (A or D)
(A-INDICATES APL-NO IN COLS. 3-6 AND MULTIPLE DE-NUMBERS IN COLS. 11-82)
(D-INDICATES DE-NO IN COLS. 3-6 AND MULTIPLE APL-NUMBERS IN COLS. 11-82)

1		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84

73d

GPO 831-276

DSC 1260-8d
May 1981

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DATA DICTIONARY UPDATE
CODES (> 8 and < 21 CHAR)

DEE & DEEE RECORDS UPDATE FORM

DATA ELEM-NO (8801)	2	3	4	5	6

REC-ID (8831)	7	8	9	10
	D	E	E	

ACTION-CODE (A-ADD C-CHANGE D-DELETE) (8890)

EXTENDED CODE (8824) (ARGUMENT) (20)

LINE-KEY (8826)

EXTENDED CODE EXPLANATION LINE (8825) (52)

1 | | | | 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 | 31 32 | 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84

73e

GPO 835-666

Section 7 (Cont.)

Once the final selection has been made, monitoring should continue throughout the life of the system. This will provide for corrections and modifications as new requirements may arise, and increase the life span of the system.

F. File Specification. Each data file designed by the analyst must be standardized in order to provide a cohesive, integrated system that interfaces efficiently with other systems. Each file specification must contain:

* File Identification and Characteristics.
  - General Description.
  - File Abstracts.
* Record Format.
* Data Element Descriptions.
* Appendices.

1. File Identification and Characteristics.
   a. General Description. A general description must be a brief narrative of the sources and general functional characteristics of a file. This information must include a brief description of file contents and purpose, identification of the system in which the file is used, a general statement of the source of data and how the file is generated, and a general statement of the source of the updating cycle and retention requirements.
   b. File Abstracts. The File Abstract is a concise definition of the physical or technical characteristics of a file in quick reference format. Use the File Abstract Form (FORM NO. ___) to describe the file.
2. Record Format. The record format must be precisely defined on a Record Layout Form (FORM NO. ___).
3. Data Element Descriptions. Each item or field defined on the record layout must be described and cross-referenced. Use the Data Dictionary Update (FORM NO. DES 1260-8) for this purpose.

Section 7 (Cont.)

The Field Name is cross-referenced from the Record Layout. Describe the data element, its source, definition of length, format, and possible values. In some cases, a field may be defined for future use.

If a security classification system exists, defining the levels and methods for personnel to access information in specified fields, then this must be so stated. For example, the contents of a field may be scrambled and only specified personnel may possess the rules for interpreting the information. Any relevant information for the understanding of the data element is entered under Additional Information.

4. Appendices. The appendices are used to record additional optional information which will assist in using the specifications. Examples include:
   a. Edit lists specifying editing criteria for acceptable and unacceptable conditions and values of various data elements in a file.
   b. Cross-reference lists specifying indices to data elements or summary tables showing the frequency and use of files within a system.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO. ___).

SYSTEM LOGIC

Section 8.

System Logic

Describe the methods and procedures required by the system. All edits, conditions, logical relationships, techniques, etc., will be defined and documented. Every aspect of the system should be analyzed carefully and critically to provide complete and sound system logic. Graphic illustrations, charts, formulas, etc., should be used when necessary to describe a system requirement.

A. Decision Logic Tables. Decision Logic Tables (DLTs) are tabular, programmable documentation of design requirements. DLTs explicitly define conditions/actions relationship rules. DLTs should be used to describe all edits and processes.

1. Decision Logic Tables provide:
   a. Distinct procedures for reflecting conditions and actions within a table and easy identification of their relationship.
   b. Display of alternatives on one form for easy examination and improvement of logic.
   c. Assurance that all possible combinations of conditions have been provided for in the rules shown, such as associating transaction codes and necessary edits.
   d. A ready checklist to enhance better planning by the analyst to reduce decision logic complexity and to locate and reduce decision logic errors.
   e. A good documentation tool that is easily prepared and reviewed.
   f. Less dependency on the original analyst interpretation by associating transactions and necessary/required test data.
2. Ordinarily Decision Logic Tables would not be used for:
   a. Search logic.
   b. Format and print routines.
   c. Input/Output routines.

B. Parameters/Ground Rules. Describe, in detail, all critical or unique conditions and contingencies that must be considered by the system. The material may be outlined in narrative form, illustrated by use of graphs or charts, or cross-referenced to existing documented methods, instructions, etc.

Section 8 (Cont.)

These edit/validation rules must provide the basis for input editing, program logic, and the control or rejection of unacceptable system input. Because of the complexity of some systems, it may be advantageous to provide decision logic tables to illustrate the edit and verification requirements.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

F. Guidelines for Designing Program Requirements.

1. Insure that the actions to be programmed have a logical flow.
2. Document or lay out the programming requirement to facilitate the programming effort.
3. Design input to provide all necessary control and reference data as well as operational data.
4. Develop output requirements with the user keeping the medium and efficient hardware utilization in mind.

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

SYSTEM CONTROLS

Section 9.

System Controls

Identify and define, in detail, the checking, balancing, or other control procedures used by user organizations to maintain validity of the system. Also, describe, in detail, the internal processing controls required by the system.

Include the methods used to provide audit trail backup, i.e., the precise means in the form of stored data file displays, regular or special request printed output (or any combination of media), whereby user organizations and internal and external auditors can conclusively establish and validate the specific values of files as of any selected date, or changes in values between any two selected dates or processing cycles.

A. External Controls for Inputs. Describe the checking/balancing criteria and control procedures utilized by user organization for each type system input. Indicate responsibility for each control function and provide references to procedure manuals, job instructions, directives, etc., used for system control support.

FORMS: SYSTEM DOCUMENTATION (A) (FORMS).

B. External Control for Outputs. Identify and define, in detail, the checking, balancing, analysis, corrective methods, or other procedural control/requirements performed by user organizations to maintain the validity of system output. It must list all erroneous conditions that may be encountered and methods for correction and reentry of data. Similarly, it must indicate responsibility for each control and procedure function, and for reference procedure manuals, job instructions, directives, etc., used for system control support.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

C. Internal Files - Systems Files/Data Sets. Describe, in detail, the internal controls incorporated within the system. For each file/data set, it should explain:

Section 8 (Cont.)

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

C. Formulas/Calculations. Describe or illustrate the arithmetic operations essential to the system. Define all requirements, including simple accumulations or totals, specified in algebraic terms or with equations. Define the symbols or terms used in each equation directly beneath the equation or set of equations.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

D. Tables, Charts, and Coding Structures. Define and describe any cross-referencing, conversion, look-up, or search requirement to be used by the system during an edit, computation, or other type processing. Cross-reference, with detail, flow charts, where applicable.

Include any table of values referenced by an arithmetic calculation. Also, state whether elements of the table are permanent; if not, specify responsibility for maintenance of the table or chart elements.

Identify Data Element Tables by name or title. Each data element must be defined with respect to characteristics, terms, and use; and all values or ranges of values of the data element must be identified and defined in detail.

FORMS:
SYSTEM DOCUMENTATION (A) (FORM NO.).
SYSTEM DOCUMENTATION (B) (FORM NO.).

E. Data Editing/Validation. Describe all necessary edit and verification operations required for each type input or transmission to the system. Identify each type input or transmission and indicate the tests required to determine its validity.

Indicate the action to be taken when an invalid condition is encountered; i.e., reject, substitute, identify and process, suspend, etc.

Section 9 (Cont.)

1. Balancing Controls. These controls describe the contents of lead records carried in the file. Explain the computer procedures by which record counts, dollar, quantity, or other value totals in these lead records are generated, and their use as controls. Outline the methods used for maintaining control totals from update to update. Illustrate the on-line messages which provide external evidence of balanced conditions.
2. Computer Processing Controls. Describe the internal processing controls required by the system. These will include job card checking, label checking, cycle generation or data checking, sequence checking, check-points and restart procedures, control of periodic variations in procedures and outputs, lockout features, security control, and operator instruction messages, except as described in balancing controls above.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

D. Manual Procedures. All of the manual procedures necessary to interface with a computer system must be designed and documented before the system is complete. These procedures include:

1. Generation and preparation of input data.
2. Data editing and coding.
3. Input data transmission, logging, and control.
4. Computer input and output control.
5. Error correction and exception procedures.
6. Output distribution.
7. Maintenance of tables, lists, and master file data.

Procedures for generation and preparation of input data should include a description of all input forms used, the sources of data to be entered in each area of the form and a description of the effect of each type of entry.

Data editing and coding procedures must incorporate rules for the disposition of forms containing missing or incorrect data. Such procedures should contain, as appendices, all tables and instructions needed to properly code each form.

DATA TRANSMITTAL

FILE NAME	SYSTEM NAME
DATE AND TIME SUBMITTED	REQUESTED COMPLETION
DEPARTMENT	RESPONSIBILITY

TYPE OF DATA

INDICATE IN FILE MAINTENANCE _____ OR TABLE CHANGES _____

CONTROL TOTALS ESTABLISHED

DISPOSITION OF INPUT FORM

PART 1. NO. OF PARTS _____

PART 2.

PART 3.

ADDITIONAL TRANSMITTALS AND HANDLING PROCEDURES

FORM NO. [illegible]

Section 9 (Cont.)

The user organization originating input data must maintain his own log of transmittal (Form No.) providing type of data, time this data is forwarded to ADP, and the control totals established.

The routing of each manual form must be described completely, as well as the disposition of each of the parts of a multiple-part form. Wherever possible, these input forms should be batched and the Data Transmittal Form submitted to data processing with adding machine controls. The flow of controls throughout the system must be documented for both the ADP Control Section and the user organization originating the input data and receiving the computer output.

All data errors and exceptions not completely resolvable by the Control Section must be detailed for the user organization and a method of correction precisely stated.

A complete procedure must be created, with appropriate forms, to accomplish the maintenance of all tables, data lists, or master file elements used in the system. The controls for the completeness and accuracy of these tables, lists, and fields must be detailed in this procedure.

Guidelines for the Design of Manual Procedures:

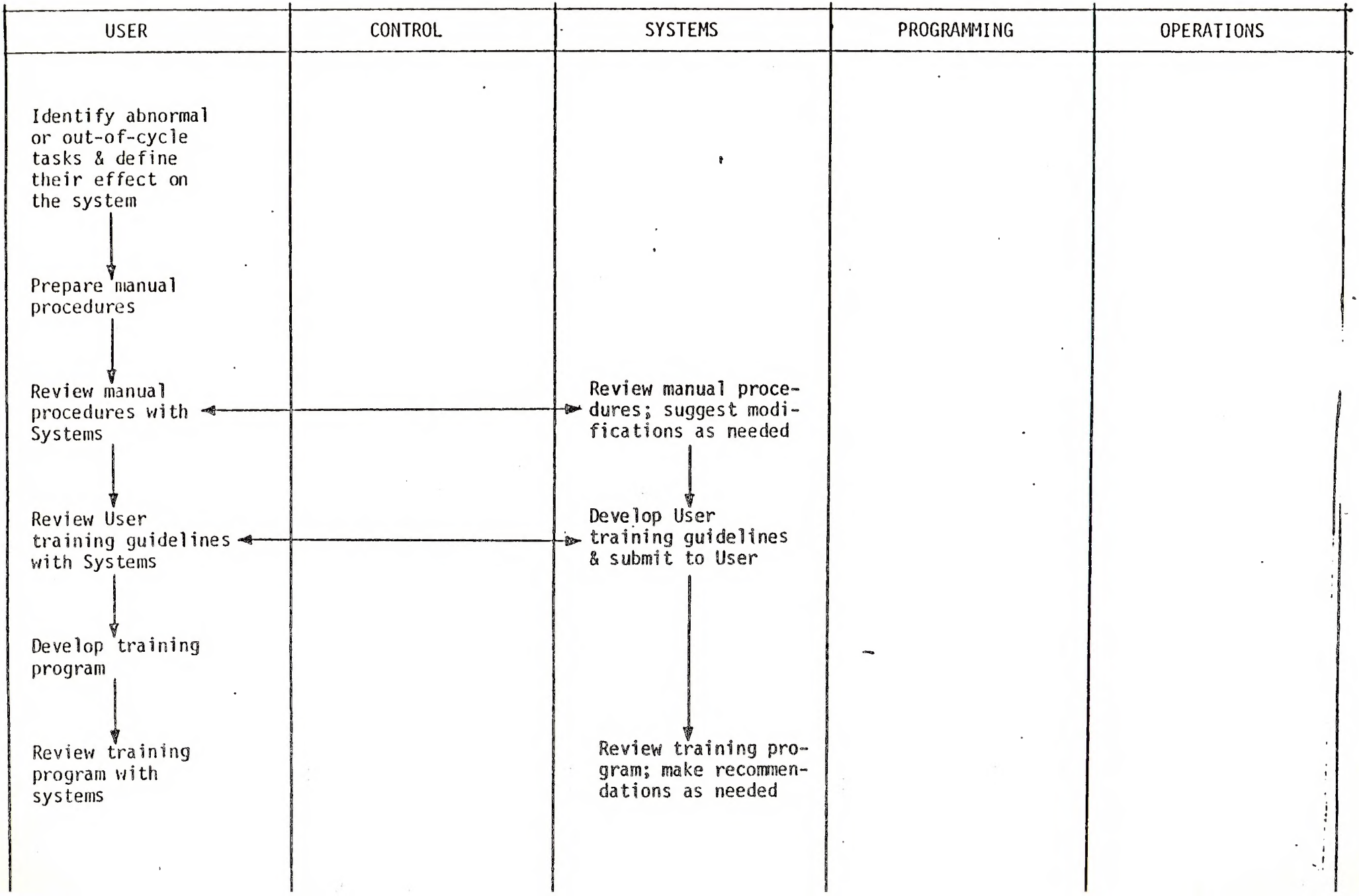
1. Manual procedures are to be kept as simple as possible. Numerous exceptions or options must be avoided.
2. Unless absolutely unavoidable, table, list, and master file changes must originate from a central source, or must pass through a central control point.
3. Each significant field on the forms must contain an entry. That is, for blank field, the inclusion of a code, or a check mark, should be required to indicate a positive condition, rather than the assumption of a condition if the field is blank.

The specific operations and procedures to be followed, and their corresponding sequence, is outlined in the diagram on the following pages. The Manual Procedures described must be followed to facilitate system processing. Each organizational unit must perform its assigned tasks in the sequence specified.

MANUAL PROCEDURES

USER	CONTROL	SYSTEMS	PROGRAMMING	OPERATIONS
Establish personnel responsibilities for tasks				
↓				
Analyze & develop staffing requirements				
↓				
Evaluate personnel requirements & authorize staffing adjustments				
↓				
Review staffing requirements with Systems	←	→		
		Review staffing requirements with User; make recommendations as needed		
↓		↓		
Evaluate User glossary; make modifications as needed	←	→		
		Develop User glossary in collaboration with User		
↓		↓		
Implement training program; review progress with Systems	←	→		
		Monitor progress of User training program		

MANUAL PROCEDURES



MANUAL PROCEDURES

USER	CONTROL	SYSTEMS	PROGRAMMING	OPERATIONS
Assign tasks		Assign tasks		
Review User guidelines with Systems		Establish User guidelines for Manual Procedures & review with User		
Develop work flow/ time schedules				
Identify sources of input & destination of output				
Review input and output schedules with Operations		Coordinate and establish input and output schedules		Review input and output schedules with User; make recommendations as needed.
Identify tasks to be performed & their sequence of occurrence				

COMPUTER PROCESSING

Section 10.

Computer Processing

The description and documentation of the processing logic of the system will contain functional flow charts, complete program descriptions, and interrelationships. Also included are detail plans or programs for data file/data set conversions required for parallel processing or for final production implementation.

A. Guidelines for Designing Processing Operations:
   1. Design program functions to minimize requirements for special operator actions.
   2. Establish program run sequences to minimize requirements to hang or remove tape.
   3. Insure that input data required for program/system operation is readily identifiable, received by the operators in logical sequence, and requires minimal evaluation and corrective action by the operators.
   4. Prepare computer run sheets to clearly define operator's actions and other run requirements. Insure that the run sheets are kept current.
   5. Furnish the operators clear and complete guidance on actions to take in the event of program, system, equipment, or environmental failure.

B. Computer Processing Flow Chart. The Computer Processing Flow Chart differs from the Detailed System Flow Chart, which was developed in Section 3 of this chapter, and included all functions, processes, and procedures, both inside and outside the Operations area, but incorporated the computer processing in a single box. The Computer Flow Chart is an expansion or "blow-up" of the computer processing and will provide an overall picture of the identification and relationship of processing segments, sequences, data sets/files/data bases, inputs, and outputs.

FORMS:

SYSTEM DOCUMENTATION (A) (FORM NO.).
SYSTEM DOCUMENTATION (B) (FORM NO.).

SYSTEM COMPONENTS IDENTIFICATIO

SYSTEM NAME	COMPONENT CLASS

ITEM NO.	TITLE	REFERENCE PAGE

RESPONSIBILITY	DATE	REV. NO.	PAGE NO

FORM NO.

Section 10 (Cont.)

C. Computer Program Index. Identify and index each program used by the system or system segment. "Program" is defined as every program written specifically for, or used by, the system. This includes utility software programs which are modified by control cards or other methods to satisfy the requirements of the system. It does not include unmodified utility programs. Generalized sub-programs/sub-routines utilized by the major programs are described on Page 6 of this section.

Instructions for the completion of the System Components Identification Form (FORM NO.) are:

1. System Name - Enter the official name of the system.
2. Components Class - Enter "Programs" to denote that items listed are programs used by the system.
3. Title - Enter the title of the program.
4. Reference Page - Enter the page number containing the program function description/flow charts.

D. Computer Program Functional Description/Flow Charts. Describe each computer program listed on the System Components Identification Form as to its purpose, function, and relationship to the system. Each description should contain sufficient detail to enable a programmer to block diagram, code, and test the program and otherwise complete the programming function.

Information regarding each program should be portrayed in the following format:

Program Title_____
Program No._____
Machine_____Est. Run Time_____
Processor_____Language_____
Program Function:_____
_____
_____

Program Title - Enter the assigned name or title of the program.
Program Number - Enter the program identification number.
Machine - Enter the machine type and model number.
Estimated Run Time - Indicate an estimated program run time.

Section 10 (Cont.)

Processor - Indicate the language processor used for program compilation; e.g., COBOL, etc.
Language - Indicate the programming language used; e.g., COBOL, FORTRAN, etc.
Program Function - Provide a detailed description of what the program does. These functions should be enumerated in numbered paragraphs or sentences. Make cross-reference, if applicable, to sub-routines and/or tables.
Flow Charts - Attach program flow charts, where applicable, to illustrate processing logic for complex requirements.

FORMS:
SYSTEM DOCUMENTATION (A) (FORM NO.).
SYSTEM DOCUMENTATION (B) (FORM NO.).

E. Sub-Program/Sub-Routine Descriptions. Describe generalized sub-programs or routines utilized by the major programs. Provide descriptions of the specialized functions and logic of all sub-programs/routines, using a separate page for each; describe the modular construction, if applicable, and identify all source (or control) programs which call for this particular sub-program/routine.

To simplify documentation and avoid redundancy, provide cross-reference to appropriate sections of the design/specifications procedures, e.g., formulas/calculations; tables, charts, and coding structures; data editing/validation; system controls; etc.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

F. File/Data Set Conversion Procedures. Describe the conversion plan and designate associated support effort required for system implementation. This plan should outline all details for new file initialization as well as for conversion of existing files, data sets, or data bases.

Section 10 (Cont.)

Each task should be specifically defined. In many cases, user support must be available. Specify the directions and estimated amount of time required for customer assistance in verifying the accuracy of new or converted files, data sets, or data bases, during parallel or initial production processing. Indicate, where applicable, any interface considerations.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

G. Disaster/Recovery Backup Procedures. Describe the procedures and techniques for system recovery in the event of loss of file or file integrity.

Assume the "worst case" disaster situation which causes complete destruction of all records within Operations, and outline the detailed steps by which the current status of data files could be reconstructed from copies of source documents, printed reports, stored files, or any combination of all media. Consider all possibilities, including activation of manual systems, etc.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

DEVELOPMENT/IMPLEMENTATION SCHEDULE

Section 11.

Development/Implementation Schedule

Specify due dates for system implementation, data input, and data output.

A. System Implementation Schedules. Indicate, in a schedule form, estimated dates for the completion of the Operations Manual (Run Book), Program Maintenance Manual, Users Manual, and job acceptance and implementation by the Operations Section.

1. Operations Manual (Run Book). The Operations Manual will provide Computer Operations personnel with a description of the software and of the operational environment so that the software can be run. (Reference "Operations Manual" - Chapter 5, Section 9 of this Manual).
2. Program Maintenance Manual. The Program Maintenance Manual will provide the maintenance programmer with the information necessary to understand the programs, their operating environment, and their maintenance procedures. (Reference "Program Maintenance Manual" - Chapter 5, Section 10 of this Manual).
3. Users Manual. The Users Manual will sufficiently describe the functions performed by the software in non-ADP terminology, such that the user organization can determine its applicability and when and how to use it. It should serve as a reference document for preparation of input data and parameters and for interpretation of results. (Reference "Users Manual" - Chapter 5, Section 11 of this Manual).

Compare the scheduled implementation date with the original estimate shown on the Project Management Chart. Make adjustments, as required, to the project management data.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

B. Input and Output Due Dates. Indicate, in schedule form, the frequency and timing for the submission of each type of input by the user organization and the frequency and timing for the production of each type of output by the Operations Section.

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

DEVELOPMENT/IMPLEMENTATION SCHEDULE

Section 11 (Cont.)

Development, implementation, and input/output schedules will be developed jointly by the User and Data Processing personnel.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

DEVELOPMENT PHASE - DESIGN/SPECIFICATIONS

GLOSSARY OF TERMS/ABBREVIATIONS

Section 12.

Glossary of Terms/Abbreviations.

List all technical terms, words, phrases, and abbreviations which require further explanation and definition. This list should be arranged in alphabetical order with each item underlined. Before finalizing this list, review each section of the Design/Specifications carefully to insure inclusion of all necessary items.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

ADP PROCEDURES

DEVELOPMENT PHASE - PROGRAMMING

Chapter 5

		Section
*	Introduction	0
*	Project Team Administration	1
*	Review Program Design Specifications	2
*	Narrative Program Description	3
*	Program Logic Flow Chart	4
*	Techniques/Tables	5
*	Input/Output	6
*	Control Information	7
*	Code/Compile	8
*	Operations Manual	9
*	Program Maintenance Manual	10
*	Users Manual	11

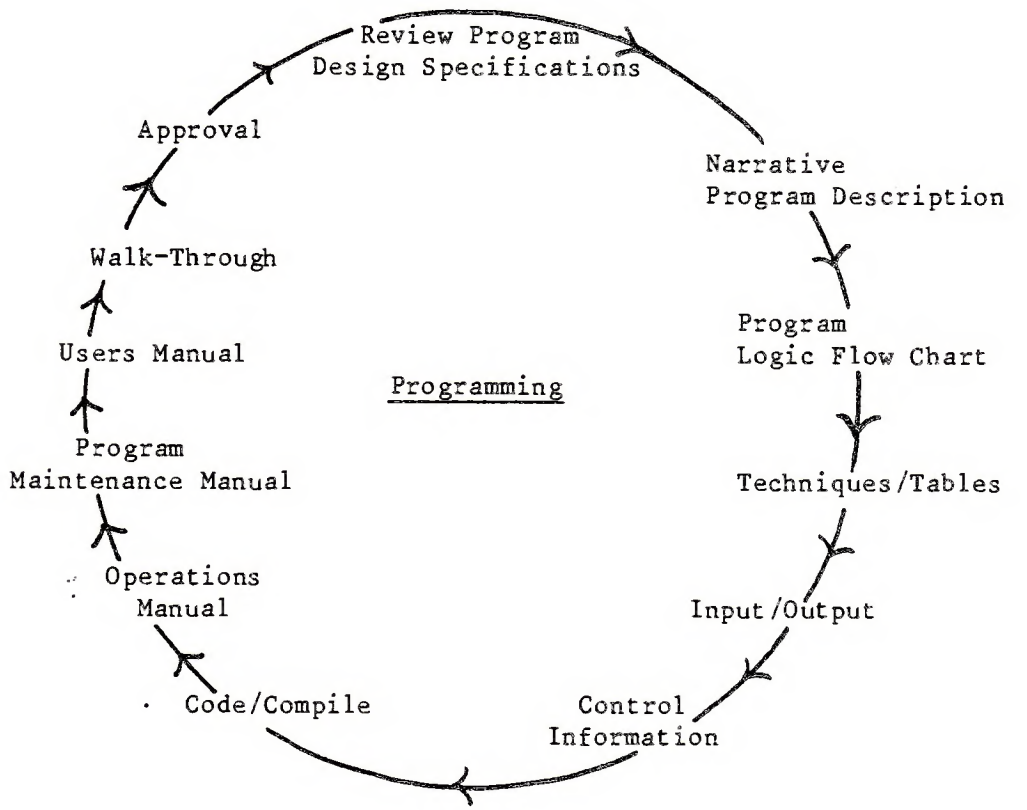
DEVELOPMENT PHASE - PROGRAMMING

INTRODUCTION

Section 0.

Introduction

During the programming stage of development, the software is coded and debugged. Documents which should be prepared or updated during this stage include the Users Manual, Program Maintenance Manual, and Operations Manual.



Programs should be developed as a set of modular programs. This is a simple approach that allows for the easy addition and deletion of subroutines. The main-line program should be simple and should branch to subroutines which are self-contained, thereby offering the best conditions for future program modifications.

INTRODUCTION

Section 0 (Cont.)

This technique has considerable efficiencies in programming time, computer time, and maintenance time since it enables complex problems to be segmented into many simple sections. A modular program reflects the program organization established in the systems modular flow chart.

The primary design criteria of modular programming are ease of understanding, ease of program modification, and standardization of program construction.

DEVELOPMENT PHASE - PROGRAMMING

PROJECT TEAM ADMINISTRATION

Section 1.

Project Team Administration.

A. Upon completion of the Design/Specifications Phase, the responsible project team member(s) will:
   1. Review program design specifications.
   2. Prepare a brief narrative description of each program.
   3. Prepare a logic flow chart for each program which pictorially represents the steps through which the program is to process data.
   4. Identify and define, in detail, all specialized techniques and tables utilized by complex programs.
   5. Describe the file organization for each input/output file. Also cross-reference each file in the system to the specific programs that either create, change, or utilize the file.
   6. Describe the program controls used to provide the means for insuring the accuracy of both data preparation and program operations.
   7. Select the program language, write source code for the program using the logic flow chart as a guide, and generate a syntax free program compile.
   8. Prepare operation manual.
   9. Prepare program maintenance manual.
   10. Prepare users manual.

B. Walk-Through. The members of the walk-through team will vary in accordance with the material being reviewed. The walk-through is chaired by the Project Coordinator and conducted by the individual responsible for the material.

   The purpose of the walk-through is to determine if all of the program requirements have been identified and defined, and to evaluate the required documentation for completeness and accuracy. Review the work plan for the Test Phase during the walk-through and make adjustments to the plan and project management data as required.

   The Programming Phase must be approved by the responsible individuals and management before the Test Phase can be initialized.

REVIEW PROGRAM DESIGN SPECIFICATIONS

Section 2.

Review Program Design Specifications

All functional program requirements should be identified and specified in the design as the first step in program development.

Review the program design specifications. Discuss the organization plan for each program with the analyst, and resolve any misunderstandings or differences of opinion.

DEVELOPMENT PHASE - PROGRAMMING

NARRATIVE PROGRAM DESCRIPTION

Section 3.

Narrative Program Description

The program description is a narrative briefly describing, in nontechnical terms, the program's major functions, procedures, special features, and equipment requirements.

A. Identification. Indicate system name, program name and number, programmer and analyst name, and data narrative written.

B. Statement of Purpose. Indicate the form of the input, the processing required, and the output expected. State, in specific terms, the objectives of the program and its requirements. Also, specify the relationship of the program to other programs in the system.

C. Special Features. Indicate programming features used for calculations, logic tests, edits, error specifications, and recovery procedures. Explain requirements for tables, if used.

D. Special Requirements. Indicate input/output requirements, list on-line, off-line equipment with special features, number of tape drives, core size, disk capacity, etc.; also, list any special subroutines required.

E. Controls. Indicate the programming controls included in the system.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

PROGRAM LOGIC FLOW CHART

Section 4.

Program Logic Flow Chart

The Logic Flow Chart is a pictorial representation of the program. It is the diagram of operations and decisions along with the sequence in which they are performed by a computer. Each symbol must describe a single program instruction or stand-alone procedure. The flow chart must precisely follow the program logic.

The Logic Flow Chart must be cross-referenced to the source language program in order to be an optimum aid in program bebugging, maintenance, and modification. The text written inside each symbol must not only identify the function of the program segment but must also correspond to the internal identification of the segment. In the COBOL language, for example, this would include the COBOL section or paragraph name.

FORMS: SYSTEM DOCUMENTATION (B) (FORM NO.).

A. Decision Logic Tables. Decision Logic Tables (DLTs) are tabular, programmable documentation of design requirements. DLTs explicitly define conditions/actions relationship rules. DLTs should be used to describe all edits and processes. Decision Logic Tables provide:
   1. Definition of detailed edit and validation requirements.
   2. Definition of update processing logic.
   3. Definitions of requirements for report extracting.
   4. A good documentation tool that is easily prepared, reviewed, and updated as the system is modified and changed.

B. Guidelines for Designing Modular Programs. Designing programs in a modular fashion may increase the time required for the planning phase of program development. However, the total time required for program development is significantly reduced due to savings in the testing, debugging, and maintenance phases.
   1. To design a modular program, the programmer will:
      a) Determine the program requirements.

Section 4 (Cont.)

b) List the requirements, elements, and functions of the program as they come to mind, giving no attention to logical order.
c) Determine the logical order of the processing routines and design the mainline of the program.
d) Construct the mainline so that the largest volume of data is processed by the lowest number of instructions (a fast mainline contributes greatly to the throughput capabilities of a program).
e) Draw the program logic flow chart (careful attention will be given to this flow chart because it will tend to reveal most errors in logic).
f) Draw the routine or routines forming each module in diagram form.
g) Flow chart each routine to the desired level of detail.

2. Mainline Components. The following segments are generally found in the mainline of most programs:
   a) Housekeeping. This segment is used to initialize certain counters and areas, and open and check files before obtaining a record.
   b) Input Handling. This section of the program gets the record, sequence checks the files, updates the input control, and handles read errors.
   c) Processing. The mainline selects and transfers control to the appropriate processing routines in the proper sequence.
   d) Output Handling. Generally these are instructions to be executed just before disposing of a record. For example, records are positioned, accounted for, formatted, and dispatched.
   e) End of Job. Included are routines to close files and verify control totals.
3. Mainline Conventions. The following conventions should be adhered to by the programmer in developing the mainline portion of a program:
   a) The mainline will make all decisions governing the flow of data to the proper processing routine on the same level.
   b) No processing routine will direct data flow to another processing routine on the same level.

Section 4 (Cont.)

c) Subordinate processing routines may be entered from a processing routine if required.
d) Input and output functions common to more than one processing routine will be controlled by the mainline.
e) All common areas will be defined as part of the mainline.

4. Processing Routine Conventions. A separate processing routine is created for each logical segment of the program and will accomplish one task in its entirety. The following conventions should be adhered to by the programmer:
   a) Each processing routine will be complete within itself. No decision made outside the routine will determine the processing within a routine and no decision within a routine will determine the processing outside the routine.
   b) Each routine will be designed so it is, in effect, a closed subroutine. Control is transferred to the processing routine from the mainline, and when the routine has performed its function it sends control back to the mainline.
   c) A processing routine may transfer control to a multiple-use subroutine. When that subroutine has performed its task, it transfers control back to the processing routine.
   d) Input or output functions that affect only one processing routine may be performed by that routine.
   e) Any results of processing to be passed back to a higher level module will be stored in an area in that higher level module.
5. FORTRAN Modular Programming Guidelines. FORTRAN, with its powerful procedure and subprogram features, is ideally suited to the concept of modular programming. The advantages to this approach include simplified maintenance, more efficient testing, easier programming, and increased flexibility.

   FORTRAN programmers should adhere to the following guidelines regarding modularity:

Section 4 (Cont.)

a) The optimum modular program will consist of a series of functional units which are dependent on the mainline program.

b) Each large module (more than 50 statements) will be analyzed to see if it can be divided into smaller modules. The mainline will serve as a control program and data transfer point. The argument lists used to communicate data to the procedures and subprograms will be restricted to less than 15 items. If additional data is required, communication through COMMON will be used to supplement the argument list.

c) All input/output routines will be isolated to a single routine in a program or a single program in a system. This technique is implied in modular programming, but will be used even if a program is not written in a modular fashion.

d) The statement label of instructions, which generates output, will be included as part of the output routine. This technique is useful in maintaining machine independence and flexibility. Actual assignment of unit codes will be placed in COMMON or read in as control information.

TECHNIQUES/TABLES

Section 5.

Techniques/Tables

Supporting the diagrammatic representation of the logic flow chart is a section on Techniques and Tables. This is an optional section which is to be used for complex programs with specialized requirements.

Tables and techniques which are self-explanatory by reference to the program listing do not require any special description. This Techniques and Table Section may, however, be required for such items as:

* Complex table structures.
* Special search techniques.
* Randomizing formulae.
* Special access formulae.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

INPUT/OUTPUT

Section 6.

Input/Output

For each input/output file, the data organization must be specified. If applicable, sorting sequence should be specified in major to minor order. Indexes and control fields must be described. If several files are logically connected in an input series, this must be explained.

Standard label formats must be specified for standard-label files.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

CONTROL INFORMATION

Section 7.

Control Information

Controls is a series of explanatory paragraphs defining how program controls imposed on inputs and/or outputs operate. They should be sufficiently detailed so that reviewers can determine whether the controls satisfy their design requirements. Included would be such controls as record counts, accumulated counts, batch controls, etc.

How Controls accomplish control should be stressed so that their validity and integrity can be satisfactorily confirmed.

A. Program controls should include controls on:
   1. Transmission of data from user or originating department to ADP.
   2. Conversion of source documents to machine-readable form.
   3. Creation and updating of master files.
   4. Transmission of data from program to program, establishing that data output from one program is intact while serving as input to another. These controls must flow through utility programs and sorts as well as application programs.
   5. Handling of error and exception conditions and their resolution.

B. Controls should be consistent. Except for data origination points or information resulting from calculations, each control figure must be derivable from controls existing at a previous step.

C. Controls should be explicit. Clearly state the course of corrective action to be taken if out-of-balance conditions exist.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COBOL

CODING FORM

PROGRAM	PROGRAMMER	DATE	IDENTIFICATION
SYSTEM		SHEET OF	73 74 75 76 77 78 79 80

PAGE | LINE | CONT. | A | B | C | COBOL STATEMENT

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72

GPO 850-282

DSC-1265-28 (Oct. 1973)

Section 8 (Cont.)

Paragraph names should be descriptive of the function being performed within each paragraph. Each paragraph should have a sequential numeric prefix for easy identification.

EXAMPLE: 85-COMPUTE-WAGES
COMPUTE-WAGES = HRS X RATE

Mnemonics are helpful when used for file identification, operations, subroutines, and other program parts. They should be descriptive and meaningful to assist the reader whenever possible.

3. Limitations. Statements such as nested IF condition codes should be avoided. Logic switches can be troublesome. Avoid the use of switches by using self-contained subroutines. If switches are used, document completely. Limit the use of GO TO verbs.
4. Tables. Tables should be used whenever possible. This technique makes changing a program easier.
5. Conserve Memory and Other Resources. Programmers should attempt to conserve core memory as much as possible through the use of various programming techniques.
   a) Use a single READ or WRITE statement per file.
   b) Use a single OPEN or CLOSE statement for multiple files.
   c) Use I/O buffers rather than work areas to speed processing.
   d) Carefully design SORT work area allocation.
   e) Use temporary data sets for intermediate file processing.
6. Data Control. All records should be sequence checked or computer sorted on input when performing sequential updates. Audit trails should be developed by dating and logging all transactions.

D. Program Logic Switches. For each internal logic switch used in the program, a Switch Chart Form must be completed.

DEVELOPMENT PHASE - PROGRAMMING

CODE/COMPILE

Section 8.

Code/Compile

A. Program Language. When a clear understanding of the program requirements has been attained, the next step in the development of the program is the selection of a programming language.
   1. COBOL. (COMMON BUSINESS ORIENTED LANGUAGE). COBOL will be used as the standard language in programming of production business applications.
   2. FORTRAN. (FORMULA TRANSLATING). FORTRAN will be used for scientific and advanced mathematical applications.
   3. BASIC. (BEGINNERS ALL-PURPOSE SYMBOLIC INSTRUCTION CODE). BASIC should be used only in an "open shop" or time-sharing environment.

B. Code. Following the selection of a programming language, the program is coded using the program logic flow chart and/or decision logic tables as a guide.

   FORMS: COBOL Coding (FORM NO. DSC 1265-28).

C. Programming Guidelines. These guidelines are established to keep programs relatively simple, readily modifiable, and understandable to all levels of programming personnel.
   1. Generalized Programs. Programs should be developed with as much flexibility as possible by the use of generalized routines which call upon external control methods for the specific parameters required for each run.
   2. Use of Statements, Notes, and Mnemonics. Each program control should contain only one statement. This makes it easier to insert new statements or change existing one.

      Note: Statements should be used liberally throughout the program to describe what is being done. This information is invaluable documentation for maintenance and system enhancement purposes, particularly when the assigned maintenance programmer did not prepare the prior program version.

Section 8 (Cont.)

Instructions for the completion of the Switch Chart Form (Form No.) are:

1. Switch Name. Use to denote the internal data field followed by a descriptive switch name.
2. Switch State. Use to describe each possible switch value. One line is used to represent an individual switch state. One summary line must be included for invalid values that will cause a given program action.
3. State Meaning. Use to briefly describe, for each switch state, the meaning of the given value.
4. Value Source. Use to indicate the source of the given value for the switch, e.g., input card, current master file record, prior master file record, prior output record.

E. Compile.

1. Desk Checking. When the coding for a program has been completed, the natural inclination is to compile it and see how it looks. However, time spent in desk checking can be very productive. Desk checking is usually the last detailed review of each functional section of the program. It provides an opportunity to see that all required processing features have been included and determine a proper relationship between the various program components. Particular attention should be paid to all structures in the Data Division, input and output routines, control break routines, accumulation of totals, subscripting, and end-of-file routine.

   Desk checking must be performed in a relatively quiet atmosphere with few outside distractions. The programmer must simulate the computer by "walking" data through each routine, keeping in mind the functional requirements of the program.
2. Pre-Compilation Desk Checking. The objective of this step is to achieve maximum benefit of the first compilations by removing coding errors that would terminate compilation prematurely, or cause an excessive number of compilation errors.

   Desk checking is performed against an 80 - 80 program listing, if this can be obtained quickly and cheaply; otherwise against an interpreted card deck.

Section 8 (Cont.)

Check specifically for:

a) Correct spelling and placement of each of the four required COBOL divisions and their associated sections.
b) Correct punctuation, especially quotes and periods.
c) Correct card deck sequence.
d) Correct external names in copy statements.
e) Correct Data Division structures.

3. Program Code Compilation. Upon completion of desk checking the program code will be compiled for syntax. Once a syntax-free compilation is achieved, a source program listing will be generated which contains the sequential organization of the program instructions in the source language. When applicable, a program cross-reference listing should also be generated.

DEVELOPMENT PHASE - PROGRAMMING

OPERATIONS MANUAL

Section 9.

Operations Manual

Each production system must provide for a complete and clear operating guide which specifically defines the processing functions and responsibilities with respect to the programs and control procedures.

This section will set forth the procedures to be followed in documenting a production job stream. The final form of the documentation described here shall be called an Operations Manual. The contents of one Operations Manual shall describe one production job stream, which would usually include the execution of more than one program. The Operations Manual provides instructions to be used by Operations personnel in scheduling, setting up, and running a given job.

A. Title Page. The first page of every operations manual must be a title page. The Title Page identifies the system and also provides an area for signing off as the different stages of development are completed.

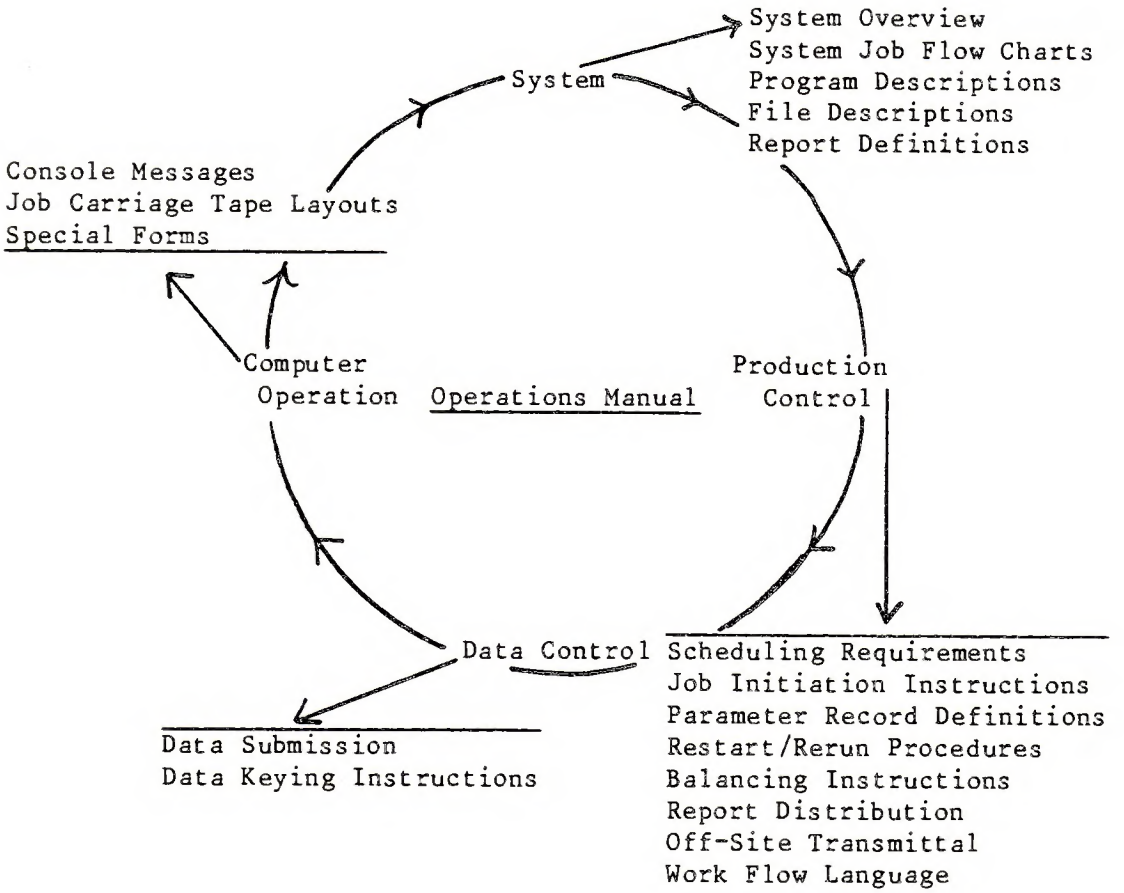
The signature of the responsible individual is required:

1. After the Operations Manual has been reviewed for completeness and accuracy during the walk-through.
2. After the program and system testing has been successfully completed and it is determined that the documentation is consistent with the processing requirements.
3. When the system is placed into a production status and formally accepted by the Computer Operations Sections.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

B. Table of Contents. The Table of Contents will contain a list of all documents associated with an Operations Manual and their corresponding page numbers. In the event that an item is not required to describe a particular job stream, it should specify, in the page column, NA for not applicable.

Section 9 (Cont.)



FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

C. System.

1. System Overview. The System Overview is a short narrative summarizing the purpose and scope for the system. A brief description of each program within the system must also be stated, as well as run frequencies and interactions with other system and files.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

Section 9 (Cont.)

2. System Job Flow Charts. The System Job Flow Chart provides Production Control personnel with a graphic overview of each system job. One flow chart is prepared for each job. The system job flow chart section is the only documentation that provides a chronological overview of the job step execution sequence of all system jobs.

   The system job flow chart should contain all programs, files, reports, and parameter records of the system. Graphic blocks for programs, files, and reports should be marked with their respective unique identification code and title.

   FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

3. Program Descriptions. The Program Description provides a brief narrative of functions of each program in the system.

   FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

4. Report Definitions. The Report Definition is a brief description of each report produced by the system.

   FORMAT:

   (Report ID) (Report Title)
   XXXXXXXXXXXXXX XXXXXXXXXXXXXXXXX
   (Report Description)
   XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
   XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

   FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

D. Production Control.

1. Scheduling Requirements. Describe the scheduling requirements of each job in the system. The information required for scheduling is documented partly with a narrative description and partly with a File Specification Description.
   a. Narrative Description. The narrative description lists the characteristics of the system that could affect the scheduling of the run. These include:
      1) Frequency of the job.

Section 9 (Cont.)

2) Calendary requirements, e.g., day of week, day of month, working day of month, etc.
3) Relationships with other production systems.
4) Estimated run time.
5) System utilities required.
6) Data base requirements.
7) Core memory, disk, and tape units required for each run unit.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

b. File Specifications. Describe, in detail, the file specifications for each program in the system.

FORMAT:

Program ID	I/O	File ID	Value of ID	Type	Close/ Retention	Record Size	Source
XXXXXXXXXX	X	XXXXX	XXXXXXXX	XXX	XXX	XXXXX	XXXXXX

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

Instructions for describing the file specifications are:

1) PROGRAM ID - The unique identification label for the program. List the programs in order of their IDS.
2) I/O File use. I = input; O = output; I/O = input and output.
3) FILE ID - The unique identification label for the file. List input files first, followed by intermediate files, and then by output files.
4) VALUE OF ID - External File ID.
5) TYPE - The type of file is indicated by using the following abbreviations:
   C = Card P = Printer
   T = Tape D = Disk

Section 9 (Cont.)

6) CLOSE/RETN - The closing and retention policies for the file. Card and tape retention periods are to be given in days. (Normally hold two backup cycles unless there are special requirements for longer retention).

The following abbreviations are used for indicating the closing or copying of a file:

C = Close
CW = Close with no rewind
CR = Close with release
CL = Close with lock
R = Remove at end of job

7) RECORD SIZE - Show record length in characters, and blocking factor of disk and tape files as a combined entry under Record Size.

8) SOURCE - Indicates where the file came from.

2. Job Initiation Instructions. Describe in detail the actions necessary on the part of Production Control to initiate the system. These may include source document review, batch balancing, deck setup, etc. This section should be written as a procedure and in sequential steps.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

3. Parameter Record Definitions. The Parameter Record Definitions provide Operations personnel with the format and content of data control cards (including data, balance, and options cards) that are input to programs that process system jobs. The information enables operations personnel to correctly identify and accurately modify cards as required. The information for parameter records is documented with a brief narrative and detailed specifications of the Records.

a. Narrative. The brief narrative describes the general use of parameter cards in the system and the method of communciation from the user.

Section 9 (Cont.)

b. Detailed Specifications.
FORMAT:

PROGRAM ID	FIELD NAME	DESCRIPTION	COLUMNS		
			FROM	TO	TOTAL
XXXXXXX	XXXXXXXXXX	XXXXXXXXXXX	XX	XX	XX

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

Instructions for describing the parameter specifications are:

1) PROGRAM ID. The unique identification label for program. Lists the parameter records in Program-ID order.
2) FIELD NAME. The field name for each field on the record.
3) DESCRIPTION. A brief description of the data required in each field, the options available, and their meaning. The following requirements should be observed:
   a) In "Description" column, give an explanation of the data required in each field, options available and their meaning.
   b) All constant data will be enclosed in quotation marks.
   c) Indicate format of the data required - MMDDYY, YYMMDD, etc.
   d) Indicate specific date to be used - current, last day of month, last working day of month, etc.
   e) Indicate left or right justification and zero fill, if required.
4) COLUMNS FROM/TO/TOTAL. The range of position for each field and the number of positions used on the card for each field.

Section 9 (Cont.)

4. Restart/Rerun Procedures. The Restart/Rerun Procedures must provide operations personnel with the necessary information to restart a system job if a particular program comes to an abnormal stop due to hardware malfunction. Software malfunctions are not within the scope of this specification; they are normally referred to the responsible system analyst for resolution. Restart procedures are provided for each application or utility program executed during system job processing. Procedures are provided for each point in each program where restart is possible.

FORMAT:

STEP NUMBER	PROGRAM IDENTIFICATION	DESCRIPTION/PROCEDURES
XX	XXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).
The instructions for describing restart and rerun procedures are:

a. STEP NUMBER. The sequential number of each job step for which restart procedures are provided.

b. PROGRAM ID. The unique identification label for the program.

c. DESCRIPTION/PROCEDURES. This column contains two different types of restart information: Description and Procedures. Description precedes the Procedure. Description describes the production processing environment of the job from a restart point of view. System design and job backup and recovery considerations relevant to restart procedures are presented.

Procedures provide step-by-step actions to be taken by the operator to restart each program at each job step. Input for Job Restart Procedures can be derived from the recovery part of the program specifications. Information typically contained in Procedures includes:

1) Restart Points in the system.
2) Data files that must be reloaded or deleted.

Section 9 (Cont.)

3) Special restart programs that must be executed.
4) Job Flow language that must be used.
5) Special instructions that must be entered by the operator.

5. Balancing Instructions. The Balancing Instructions provide the necessary details to balance the output of a system, including corrective action to be taken if totals do not balance. Also include an illustration of the balance sheet.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

6. Report Distribution. The Report Distribution provides Production Control with the information needed to distribute outputs of production jobs to end users. Distribution control information includes the type of form the output is produced on, post-production preparation of the output, and the identity and location of the recipient.

FORMAT:

REPORT ID AND NAME	FORM ID	COPIES	PREPARATION INSTRUCTIONS	DISTRIBUTION
XXXXXXXXX XXXXXXXXX	XXXX	XX	XXXXXXXXXXXXXX XXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

Instructions for describing report output requirements and distribution are:

a. REPORT ID AND NAME. The report ID and the title of the output.
b. FORM ID. The number of the form or stock on which the output is prepared.
c. COPIES. The number of copies of the output produced.
d. PREPARATION INSTRUCTIONS. The instructions to Production Control personnel for handling and preparing the output for distribution.

Section 9 (Cont.)

Some routine output handling and preparation tasks are: deliver as is; decollate; burst; trim; bind; with input; with messages; mark confidential; will call; hard copy; destroy; etc.

e. DISTRIBUTION. The name of the organization and/or location that is the recipient of the output. If multiple copies of a report are distributed to multiple recipients, this column must identify each recipient.

7. Off-Site Transmittals. Describe any requirements for the transmittal of system data off-site, either to off-site storage, an off-line printer, or a microfiche processor.
FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

8. Job Control Language (JCL). The Job Control Language is the means by which jobs are described and presented to the computer system. This language allows the user to describe each job as an interrelated set of tasks to be performed. Both serial and parallel task execution is possible.

Jobs will be accepted from:
a) Online card readers.
b) Remote Job Entry (RJE) stations.
c) Operator Display Terminals (ODT).
FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

E. Data Control. Describe the data entry instructions for Data Control. The instructions will consist of a Data Submission narrative and Data Keying Instruction Forms.

1. Data Submission. The Data Submission narrative includes information on:
   a. What the source documents are, where they are from, and when they will be received by Data Control.
   b. Whether the documents are to be keypunched and verified.
   c. When and where the source documents and cards are to be distributed.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

DSC 1260-28
(April 1981)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
KEY-ENTRY INSTRUCTIONS

JOB TITLE _____ PAGE _____

FORMAT NAME _____ REFORMAT REQUIRED?

RECORD TYPE _____ _____ YES _____ NO

INPUT RECORD SIZE _____ OUTPUT RECORD SIZE _____

FIELD	INPUT – COLUMNS – OUTPUT						VALIDATIONS
	FROM	THRU	NUM	TYPE	FROM	THRU	

CONTACT NAME AND OFFICE CODE _____

CONTACT TELEPHONE NUMBER _____

Section 9 (Cont.)

2. Data Keying Instructions.
   a. Guidelines for data entry.
      1) Show all data items to be entered.
      2) Cross reference each data item to the corresponding item on the source document by the use of the name field.
      3) Submit a sample source document with document items circled along with the filled out Key Entry Instruction Form.
      4) Submit the Request for Key Entry Services with the 1260-28 Form.
   b. This form should be completed with the assistance of the Key-Entry Section. Instructions for the completion of the Key-Entry Instruction Form (Form No. DSC 1260-28) are:
      1) JOB TITLE. The name of the job.
      2) FORMAT NAME. The key-to-disk format assigned.
      3) RECORD TYPE. The record type being keyed.
      4) INPUT RECORD SIZE. Size in characters.
      5) OUTPUT RECORD SIZE. Size in characters.
      6) FIELD. Name of the field being keyed.
      7) INPUT-COLUMNS-OUTPUT. Enter the columns on the source document, the number of characters, and the columns on the keyed record.
      8) VALIDATIONS. Instructions on validations, edits, and verification.
      9) CONTACT. Individual who can answer questions on data.

F. Computer Operations.
   1. Console Messages. The console messages provide Operations Personnel with descriptions of console messages and the procedures for responding to those messages. Messages generated by each program executed during the system job processing are documented for each program.

Section 9 (Cont.)

FORMAT:

PROGRAM ID	MESSAGE	REASON/ACTION
XXXXXXX	XXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXX

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

Instructions for describing the console messages are:

a. PROGRAM ID. The unique identification label for the program. List the programs in order of their IDs.

b. MESSAGE. This is the literal message that will appear to the operator on the console. Only messages requiring an operator response should be documented. It is to be understood that any other messages are to be ignored by the operator. Messages usually take one of two forms - textual or coded. Whether messages are in text or code, they generally require an explanation; this is to be provided in the adjacent description column. Every effort should be made to present the message precisely as it will appear on the console. Special attention should be given to capitalization, punctuation, and spacing of messages when documenting them. The message should be enclosed in quotes on the form.

c. Reason/Action

1) REASON. This is an explanation of the reason for each message in the message column. There must be a description for each message; blanks are not acceptable.

2) ACTION. This is a list of procedural steps to be taken by the operator, in response to a message, to remedy the cause of an abnormal stop in program execution. Action procedures must be sufficiently complete to permit the operator to remedy the cause of the message. If the action contents cannot satisfy this test, then the message the action applies to does not meet the criteria for being documented in the console messages. That criteria stipulates that only messages the operator can respond to are to be documented.

JOB CARRIAGE TAPE LAYOUT FORM

System Name _____

Program	File ID	Frequency

Form No. _____

Report ID and Name _____

Channel	Line Number
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Instructions _____

_____

_____

Alignment Guide _____

_____

_____

Comments _____

_____

_____

FORM NO.

Section 9 (Cont.)

2. Job Carriage Tape Layouts. The Job Carriage Tape Layout provides Operations Personnel with the information needed to punch carriage control tapes for printer formatting of system job outputs.

   The information for job carriage tape layouts is documented on the Job Carriage Tape Layout Form.

   Instructions for the completion of the Job Carriage Tape Layout form (Form No.) are:

   a. SYSTEM NAME. The title of the system.
   b. PROGRAM ID. The unique identification label for the program. List the programs in order of their IDs.
   c. FILE ID. The identification of the file from which the report is produced.
   d. FREQUENCY. A statement of how often the job is normally processed. It is usually expressed in the number of occurrences per day, week, or month. Occasionally it is expressed as "Year End" or "Quarterly".
   e. FORM NO. The form number on which the report is printed.
   f. REPORT ID AND NAME. The report ID and name of the report produced.
   g. CHANNEL/LINE NUMBER. A tabular schematic that lists the tape channels and the lines of the output that the functions controlled by the channel apply to.
   h. INSTRUCTIONS. This tells the person preparing the tape what to do with it.
   i. ALIGNMENT GUIDE. Instructions on how to align the stock that will be printed under the control of the carriage tape.
   j. COMMENTS. A place for miscellaneous statements about the form or job, or about the tape if pre-defined components will not accommodate the information.

Section 9 (Cont.)

3. Special Forms. The Special Forms provide Operations Personnel with specifications and procedures for aligning job outputs that require precise character placement on preprinted forms stock. An alignment template and a finished form should be included in the sample. The contents of this part provide Operations Personnel with a convenient reference to the alignment steps for each special form that is output during system job processing.

   FORMS: Preprinted or special form stock.

DEVELOPMENT PHASE - PROGRAMMING

PROGRAM MAINTENANCE MANUAL

Section 10.

Program Maintenance Manual

The purpose of these procedures is to assist the analyst and programmer in developing a comprehensive documentation package that specifies the development, maintenance, and operation of each program. These procedures must also provide the maintenance programmer with the information necessary to understand the programs, their operating environment, and their maintenance procedures.

The final form of the documentation, which is generated during the Initiation and Development Phase of the System Life Cycle, shall be called a Program Maintenance Manual. The contents of one Program Maintenance Manual shall describe one production job stream, which would usually include more than one program.

A. Title Page. The first page of every Program Maintenance Manual must be a title page. The title page identifies the system and also provides an area for signing off as the different stages of development are completed.

The signature of the responsible individual is required:

1. After the Program Maintenance Manual has been reviewed for completeness and accuracy during the walk through.
2. After the program and system testing has been successfully completed, and it is determined that the documentation is consistent with the processing requirements.
3. When the documentation is placed in the library and formally accepted by the Librarian.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

B. Table of Contents. The Table of Contents will contain a list of all documents associated with a Program Maintenance Manual and their corresponding page numbers. In the event that an item is not required to describe a particular job stream, it should specify, in the page column, NA for not applicable.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ORDER FOR ADP REPORT ACTION

INSTRUCTIONS

Prepare two approved orders and submit to Division of Data Processing, DSC

TO: Division of Data Processing
Denver Service Center

FROM: *(Requesting office)*

REQUESTING OFFICE AND ACTIVITY CODES

ORGANIZATION		ACTIVITY	WORK CODE OR PROJECT
STATE	OFFICE		

DELIVER REPORT TO:
Name
Office

Number of copies	Required delivery date

Type of report action *(check one)*

(1) ☐ Provided for in a system but requested out of regular cyclical report date
(2) ☐ Not provided for in a system but using data available in the system
(3) ☐ From an existing computer program using special data inputs
(4) ☐ Cancel

Report title or description *(For type (2) report action include instructions as to column headings, format, and data wanted. Attac additional sheets or illustrations as needed to make request clear. For type report action (4) state method being used in lieu o the report.)*

Why is report needed?

Has same or similar report been ordered in the past? ☐ Yes ☐ No ☐ Unknown *(If "yes," give date)*

Will same or similar report be needed in the future? ☐ Yes ☐ No ☐ Unknown *(If "yes," give frequency and check the requirements in Bureau Manual 1265 for extension of existing system)*

Binding Instructions ☐ As printed ☐ Burst ☐ Top binding ☐ Side binding

DIVISION OF DP ONLY

Date received	ADP cost code
Date completed	

ESTIMATED COST

Personal services	$
Machine time	
Supplies	
Other	
TOTAL	$

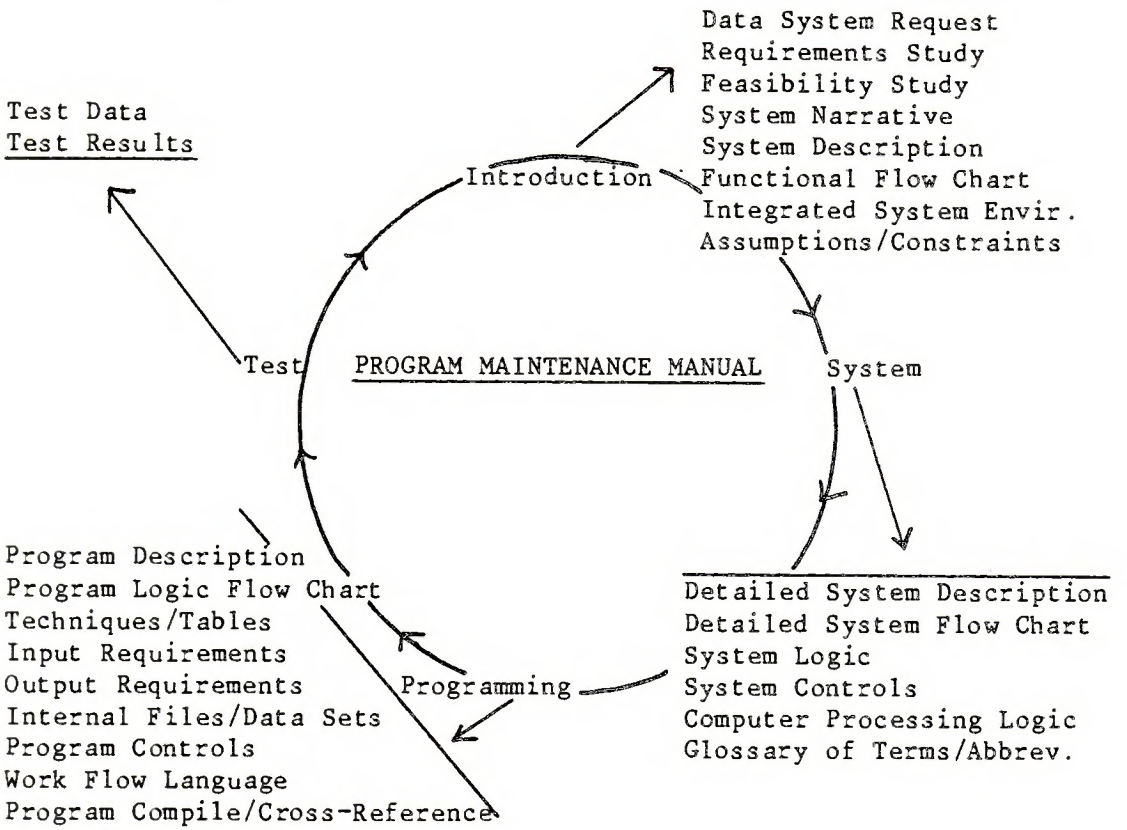
Requested by *(signature)*	Date

Title

Approved by *(signature)*	Date

Title

Form 1265–1 (December 1970)
GPO 832-232



FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

C. Introduction

1. Order for ADP Report Action (1265). The 1265 provides a convenient method to document a request of data processing services: All 1265s will be maintained in the Program Maintenance Manual.
2. Requirements/Feasibility Study. The Requirements/Feasibility Study provides detailed information for evaluation of the economic and technical feasibility of a proposed new system or major modification.
   a. Requirements Study. The requirements are written by the requestor to describe the requirements of a proposed new system or major modification in the requestor's own terms.

Section 10 (Cont.)

b. Feasibility Study (As Required). The Feasibility Study elaborates on the Requirements Study and presents the system and its costs in more detail and in a more technical manner by the systems analyst.

3. System Narrative. The system narrative is written to outline the purpose of the system, the scope in terms of functional and organizational involvement; and authorization of the system.
4. System Description. The system description consists of a generalized functional description of the new system or major modification.
5. Functional Flow Chart. The functional flow chart graphically portrays the informational flow of the system. All functions, processes, procedures, and organizations are identified.
6. Integrated System Environment Chart. The integrated system environment chart shows existing or proposed interface with all other manual or machine systems.
7. Assumptions/Constraints.
   a. Assumptions. Those conditions that cannot be supported by factual information.
   b. Constraints. Circumstances or limitations upon which the system must depend.

D. System.
1. Detailed System Description. The detailed system description expands the general description of the system and consists of an in-depth functional narrative of the new system or major modification.
2. Detailed System Flow Chart. The detailed system flow chart expands the functional flow chart consisting of a detailed graphic portrayal of all functions, processes, procedures, and organizations of the system.
3. System Logic. System logic is a description of the methods and procedures required by the system. All edits, conditions, logical relationships, techniques, etc., are defined. Graphic illustrations, charts, formulas, etc., are used when necessary to describe a system requirement.

Section 10 (Cont.)

4. System Controls. System controls identify the checking, balancing, or other control procedures used by user organizations to maintain validity of the system. The internal processing controls are also described.
5. Computer Processing Logic. Computer processing logic describes the processing logic of the system. It contains computer processing flow charts which provide an overall picture of the identification and relationship of processing segments, sequences, data sets/files/data bases, inputs, and outputs. Also included are program descriptions/specifications and inter-relationships.
6. Glossary of Terms/Abbreviations. The glossary of terms/abbreviations are technical terms, words, phrases, and abbreviations, which require further explanation and definition.

E. Programming.
1. Program Description. The program description is a narrative briefly describing, in non-technical terms, the program's major functions, procedures, special features, and equipment requirements.
2. Program Logic Flow Chart. The program logic flow chart is a pictorial representation of the program. It is the diagram of operations and decisions along with the sequence in which they are performed by a computer.
3. Techniques/Tables. The techniques/tables documentation is used for complex programs with specialized requirements, which are not self-explanatory by reference to the program listing.
4. Input/Output.
   a. System Input Requirements. System inputs describe each input medium as to its purpose, function, and relationship to the system. The data organization, sorting sequence, indexes, and control fields are specified for each input file. Include copies of all manually or mechanically prepared documents to be converted to a machine-readable form for the program.

Section 10 (Cont.)

b. System Output Requirements. System outputs describe each output product as to its purpose, function, and its relationship to other output supports. The data organization sorting sequence, indexes, and control fields are specified for each output file.

5. Internal Files/Data Sets. The internal files/data sets describe each internal output file/data set with respect to purpose, function, and its relationship to other system output. The data organization, sorting sequence, indexes, and control fields are specified for each output file.
6. Program Controls. Control information is a series of explanatory paragraphs defining how program controls imposed on inputs and/or outputs operate. JCL read by the program is also listed.
7. Program Compile/Cross-Reference. Each program is documented with a source program listing obtained from the compilation. This is the computer sequential organization of program instructions in the source language. The sections or paragraphs of the programs are cross-referenced to flow charts and other documentation elements. Also, for each program, a computer generated cross-reference listing is produced of declarations and uses of all data-names, file-names, condition-names, etc.

F. Test.

1. Test Data. Test data includes all data used to test and debug each program and the system. The purpose and function of the input medium and its relationship to the system are described. All test data/files are listed and maintained for future use.
2. Test Results. The purpose and function of the output product and its relationship to other output products or to other interfacing systems which it supports are described. Include samples of the output test results.

USERS MANUAL

Section 11.

Users Manual

Each production system must provide for a complete and clear user's guide. The purpose of the user's guide is to sufficiently describe the functions performed by the software in non-ADP terminology, such that the user organization can determine its applicability and when and how to use it. It should serve as a reference document for preparation of input data and parameters and for interpretation of results.

This section will set forth the procedures to be followed in documenting a user's guide. The final form of the documentation described here shall be called a user's manual. The contents of one user's manual shall describe one production system.

A. Title Page. The first page of every user's manual must be a title page. The title page identifies the system and also provides an area for sign off.

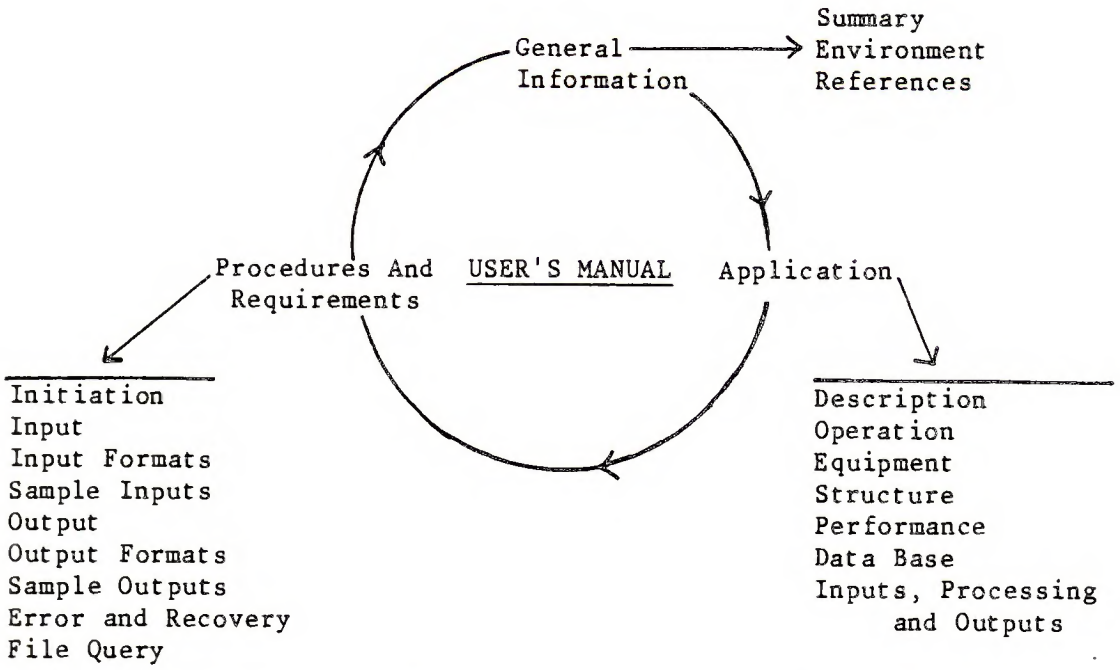
The signature of the responsible individual is required:

1. After the program and system testing has been successfully completed, and it is determined that the documentation is consistent with the processing requirements.
2. When the system is placed into a production status and the user's manual is formally accepted by the user organizaton.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

B. Table of Contents. The table of contents will contain a list of all documents associated with a user's manual and their corresponding page numbers. In the event that an item is not required to describe a particular job stream, it should specify, in the page column, NA for not applicable.

Section 11 (Cont.)



FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

C. General Information.

1. Summary. Summarize the application and general functions of the software.
2. Environment. Identify the user organization and computer center where the software is installed.
3. References. List applicable references, such as:
   a. Project request (authorization).
   b. Previously published documents on the project.
   c. Documentation concerning related projects and software.
   d. FIPS publications and other reference documents.

FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

D. Application.

1. Description. Describe when and how the software is used and the unique support provided to the user organization. The description should include:
   a. Purpose of the software.

Section 11 (Cont.)

b. Capabilities and operation improvements provided.
c. Functions performed.

2. Operation. Show the operating relationships of the functions performed to the organization that provides input to and receives output from the software. Describe security and privacy considerations. Include general charts and a description of the inputs and outputs shown on the charts.
3. Equipment. Describe the equipment on which the software can be run.
4. Structure. Show the structure of the software and describe the role of each component in the operation of the software.
5. Performance. Describe the performance capabilities of the software including, where appropriate:
   a. Quantitative information on inputs, outputs, response time, processing times, and error rates.
   b. Qualitative information about flexibility and reliability.
6. Data Base. Describe all data files in the data base that are referenced, supported, or kept current by the software. The description should include the purpose for which each data file is maintained.
7. Inputs, Processing, and Outputs. Describe the inputs, the flow of data through the processing cycle, and the resultant outputs. Include any applicable relationships among inputs or outputs.

FORMS:

SYSTEM DOCUMENTATION (A) (FORM NO.).
SYSTEM DOCUMENTATION (B) (FORM NO.).

E. Procedures and Requirements. This section should provide information about initiation procedures, and preparation of data and parameter inputs of the software. The scope, quality, and logical arrangement of the information should enable the user to prepare required inputs and should explain, in detail, the characteristics and meaning of the outputs. It should also describe error, recovery, and file query procedures and requirements.

1. Initiation. Describe step-by-step procedures required to initiate processing.

Section 11 (Cont.)

2. Input. Define the requirements of preparing input data and parameters. Typical considerations are:
   a. Conditions--e.g., personnel transfer, out of stock.
   b. Frequency--e.g., periodically, randomly, as a function of an operational situation.
   c. Origin--e.g., Personnel Section, Inventory Control.
   d. Medium--e.g., keyboard, punched card, magnetic or paper tape.
   e. Restrictions--e.g., priority and security handling, limitations on what files may be accessed by this type of transaction.
   f. Quality control--e.g., instructions for checking reasonableness of input data, action to be taken when data appears to be in error, documentation of errors.
   g. Disposition--e.g., instructions necessary for retention or release of all data files received, other recipients of the inputs.
3. Input Formats. Provide the layout forms used in the initial preparation program data and parameter inputs. Explain each entry, and reference it to the sample form. Include a description of the grammatical rules and conventions used to prepare input, such as:
   a. Length--e.g., characters/line, characters/item.
   b. Format--e.g., left justified.
   c. Labels--e.g., tags or identifiers.
   d. Sequence--e.g., the order and placement of items in the input.
   e. Punctuation--e.g., spacing and use of symbols (virgule, asterisk, character combinations, etc.) to denote start and end of input, of lines, of data groups, etc.
   f. Combination--e.g., rules forbidding use of groups of particular characters or combinations of parameters in an input.
   g. Vocabulary--e.g., an appendix which lists the allowable character combinations or codes that must be used to identify or compose input items.
   h. Omissions and Repeats--e.g., indicate those elements of input that are optional or may be repeated.

Section 11 (Cont.)

i. Controls--e.g., header or trailer control data.

4. Sample Inputs. Provide specimens of each complete input form. Include:
   a. Control or header--e.g., entries that denote the input class or type, date/time, origin, and instruction codes to the software.
   b. Text--e.g., subsections of the input representing data for operational files or that request parameters for an information retrieval program.
   c. Trailer--e.g., control data denoting the end of input and any additional control data.
   d. Omissions--e.g., indicate those classes or types of input that may be omitted or are optional.
   e. Repeats--e.g., indicate those positions of the input that may be repeated.
5. Output. Describe the requirements relevant to each output. Typical considerations are:
   a. Use--e.g., by whom and for what.
   b. Frequency--e.g., weekly, periodically, or on demand.
   c. Variations--e.g., modifications that are available to the basic output.
   d. Destination--e.g., computer area or remote terminal.
   e. Medium--e.g., printout, CRT, tape, cards.
   f. Quality control--e.g., instructions for identification, reasonableness checks, editing, and error correction.
   g. Disposition--e.g., instructions necessary for retention or release, distribution, transmission, priority, and security handling.
6. Output Formats. Provide a layout of each output. Explanations should be keyed to particular parts of the format illustrated. Include:
   a. Header--e.g., title, identification, date, number of output parts.
   b. Body--e.g., information that appears in the body or text of the output, columnar headings in tabular displays, and record layouts in machine readable outputs. Note which items may be omitted or repeated.
   c. Trailer--e.g., summary totals, trailer labels.
7. Sample Outputs. Provide a sample of each type of output. For each item on a sample, include:

Section 11 (Cont.)

a. Definition--e.g., the meaning and use of each information variable.
b. Source--e.g., the item extracted from a specific input, from a data base file, or calculated by software.
c. Characteristics--e.g., the presence or absence of the item under certain conditions of the output generation, range of values, unit of measure.

8. Error and Recovery. List error codes or conditions generated by the software and corrective action to be taken by the user. Indicate procedures to be followed by the user to ensure that any restart and recovery capability can be used.

9. File Query. Prepare this paragraph for software with a file query retrieval capability. Include detailed instructions necessary for initiation, preparation, and processing of a query applicable to the data base. Describe the query capabilities, forms, commands used, and control instructions required.

   If the software is queried through a terminal, provide instructions for terminal operators. Describe terminal set-up or connect procedures, data or parameter input procedures, and control instructions. Reference related materials describing query capabilities, languages, installation conventions and procedures, program aids, etc.

   FORMS: SYSTEM DOCUMENTATION (A) (FORM NO.).

ADP PROCEDURES

DEVELOPMENT PHASE - TEST

CHAPTER 6

DEVELOPMENT PHASE

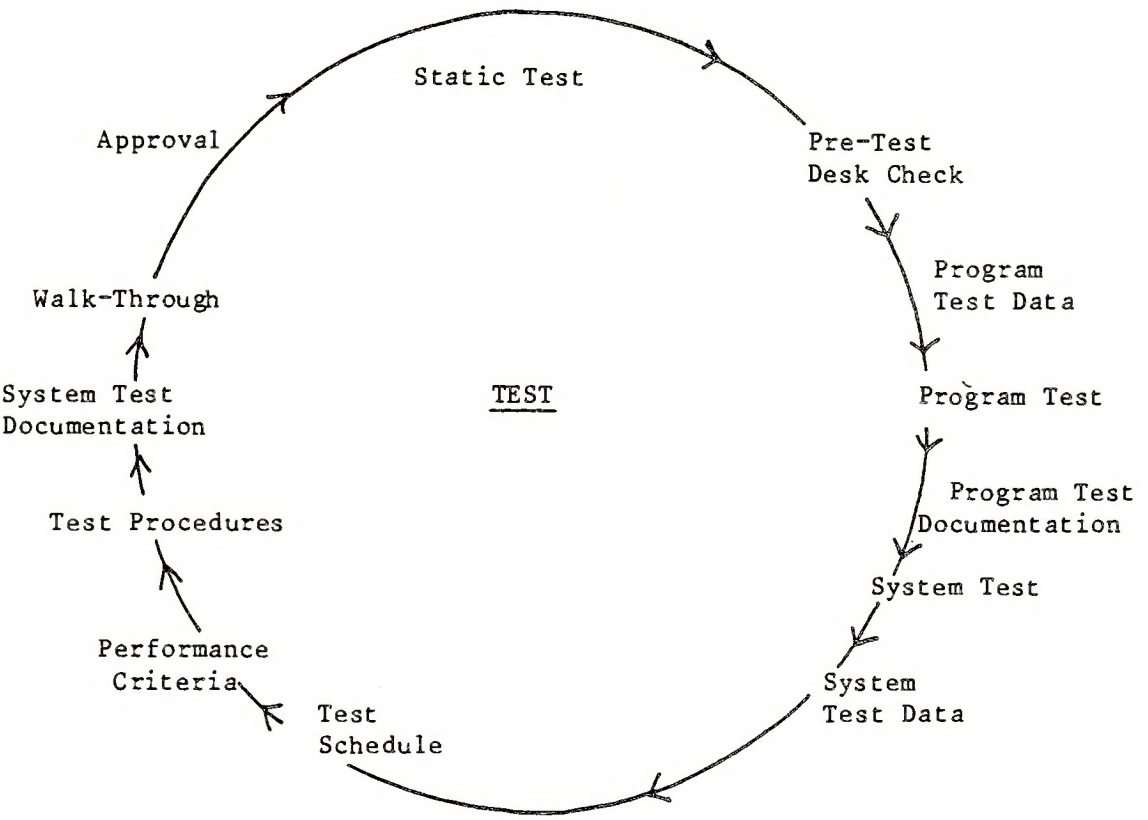
INTRODUCTION

Section 0.

Introduction

During the Test Stage of development, the software is tested and related documentation reviewed. The software and documentation are evaluated in terms of readiness for implementation.

Testing computer software consists of static and system tests. The static, or unit, test is the testing of individual programs. The System Test is the testing of a production job stream, which would usually include a series of programs in their processing sequence.



DEVELOPMENT PHASE - TEST

PROJECT TEAM ADMINISTRATION

Section 1.

Project Team Administration

A. Upon completion of the Programming Phase, the responsible project team member(s) will prepare a Test Plan including appropriate elements from the list below:
   1. Review processing logic of source program listing(s).
   2. Prepare program test data.
   3. Execute program tests and evaluate test results to assure that the program performs according to specifications.
   4. Compile static test documentation.
   5. Prepare system test data.
   6. Prepare system test schedule.
   7. Establish system performance criteria.
   8. Execute the system test and evaluate test results to assure that the system performs according to specifications.
   9. Review the Users, Operations, and Program Maintenance Manuals to assure that the documentation is consistent with the processing requirements.
   10. Compile system test documentation.

B. Walk-Through. The members of the walk-through team will vary in accordance with the material being reviewed. The walk-through is chaired by the Project Coordinator and conducted by the individual responsible for the material.

   The purpose of the walk-through is to determine if the program(s) and system perform according to specifications, and to assure that the required documentation is complete and consistent with the processing requirements.

   The Test Phase must be approved by the responsible individuals and management before the Operation Phase can be initialized.

DEVELOPMENT PHASE - TEST

STATIC TEST

Section 2.

Static Test.

When a program has been coded, desk checked, and a syntax free compile obtained, static testing will be conducted to assure the program functions according to specifications.

Since system testing can be an expensive operation, involving numerous people and considerable machine time, it is essential that every effort be made to detect errors during static testing of the individual programs.

Static testing is the responsibility of the programmer. Adequate test data should be prepared to test the main-line process of the program and all exceptions. Develop predetermined output which will facilitate checkout. Minimize hands-on testing and costly compilation and retesting time by performing extensive "desk checking" prior to the next test of a program.

DEVELOPMENT PHASE - TEST

PRE-TEST DESK CHECK

Section 3.

Pre-Test Desk Check

The objective of this step is to achieve maximum benefit from the first program test by reducing the likelihood of abnormal termination and checking that the code does satisfy program specifications.

Incomplete desk checking may result in excessive use of machine time during checkout, increased programmer effort to correct errors, and a greater chance of exceeding the scheduled completion date.

Particular areas for review are:

A. Initialization Logic.
   1. Initializing working storage fields.
   2. Opening files.
   3. Processing of file control records.
   4. Loading tables.

B. Termination Logic.
   1. Closing files.
   2. Displaying end-of-job messages.
   3. Writing the file control records.
   4. Writing stored records or tables.

C. File-Handling Logic.
   1. Sequence checking.
   2. File matching.
   3. Control break testing.
   4. Initial read routines.
   5. End-of-file processing.

D. Report Generation.
   1. Page overflow handling.
   2. Control-break processing.
   3. Totaling logic.
   4. End-of-job output.

Section 3 (Cont.)

E. Processing Logic.
1. AND/OR decisions.
2. Validation of all raw input.
3. All first time or one time logic.
4. Looping.
5. Division by zero.
6. Subscripting.

DECISION TABLE

	Rule 1	Rule 2	Rule 3	Rule 4
Condition Stub		Condition Entry		
Action Stub		Action Entry		

PROGRAM TEST DATA

Section 4.

Program Test Data

Preliminary testing of a computer program should utilize small, representative test-data files so as to avoid long, expensive test runs on large "LIVE" data files. Frequently, test files can be created by extracting a few records from an existing file.

The objective of test data preparation is to set up sample transactions, test files, and/or data bases that will adequately test a program or sub-program. Creation of comprehensive test data can be a time consuming task, but it is imperative to the successful implementation of a system. Assuming that any portion of a program does not require testing can lead to costly failures.

A. Timing. Preparation of test data should begin immediately after the coding while the processing requirements are fresh in one's mind.

B. Test Data Sources. Existing test data sources can be used if all necessary test combinations are present, and the volume of test data is not excessive.
   1. Test data sources are:
      a. Copies of production files.
      b. Selections from production files by some utility.
      c. Output from another program in the system.
      d. A test data generator.
      e. Card to tape/disk utilities.
      f. Unique test file creation programs.
      g. On line input.
      h. Card input.

C. Test Data Combinations. Specific attention should be paid to testing the following conditions:
   1. All combinations of file match/mismatch.
   2. All combinations of missing or variable occurrence records within a file.
   3. All error conditions.
   4. All combinations of EOF situations.
   5. All variations of run control parameters.
   6. Extreme ranges of field values.

   It is usually necessary to create more than one input test file to test these conditions.

FORMS: ~~Condition~~ Decision Table (~~FORM NO. DSC-1265-25~~).

PROGRAM TEST

Section 5.

Program Test

All types of program input must be tested, all types of program output must be generated, and every line of program code must be executed.

The intent and expected result of each test input must be documented and retained. This is particularly important for one-line program testing. It is usually helpful to note the intent within the test data itself, by using a character field that is not significant to processing control.

Those programs which generate output files to be used as input to the following cycle must be tested through two or more cycles to assure that those files cycle correctly; i.e., the file which is output from one cycle is acceptable as input to the next cycle and that valid outputs are created from it.

JUNE 1981

PAGE_____ OF_____

DATA FILE LAYOUT SHEET
COBOL

DATE:_____

APL NAME(8850)	NUM:	PROG ID(8835)	PROG NAME:
FILE NAME(8861)	FILE ID:		FILE CD(8843)
ORGANIZATION(8889)	ACCESS(8849)		REC KEY(8866)
BLOCK SZ(8858)	CD-SET(8891)		LABEL(8851)
REC SZ(8863)	FILE SEQ(8867)		RETENTION(8864)
DATA RECORD(S)(8853)			

LEVEL 8869	MNEMONIC 8802	DE NUMBER 8801	PICTURE 8805	SIZE 8804	POSITION BEG 8817	POSITION END 8879	REMARKS

JUNE 1981

PAGE____ OF____

DATA FILE LAYOUT SHEET
REX

DATE:__________

APL NAME(8850)		NUM:	FILE NAME(8861)			FILE ID:
E NUM 8893	DATA ELEMENT NAME 8802	INPUT WIDTH 8804	DATA TYPE 8805	DE NUMBER 8801	REMARKS	
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						
E						

DEVELOPMENT PHASE - TEST

PROGRAM TEST DOCUMENTATION

Section 6.

Program Test Documentation

A. Test Data. The test data documentation includes all data used to test and debug each program. Describe each input medium as to its purpose, function, and relationship to the program. The data organization, sorting sequence, indexes, and control fields are specified for each test file.

B. Test Results. Describe each output product from the test run as to its purpose, function, and relationship to other output products or to other programs. The data organization, sorting sequence, indexes, and control fields are specified for each output file.

All test data/files are listed and maintained for future use. Include samples of the output test results.

FORMS:

SYSTEM DOCUMENTATION (A) (FORM NO.).
DATA FILE LAYOUT SHEET - COBOL.
DATA FILE LAYOUT SHEET - REX.
80 COLUMN LAYOUT SHEET (FORM 1265-9).

DEVELOPMENT PHASE - TEST

SYSTEM TEST

Section 7.

System Test

When all programs within a system have been individually tested, a system test plan developed, and system test data created, coordinated testing of all system components can be conducted.

Although the various programs have already passed static testing, the system test must again test all program logic, all inputs, outputs, and cycling capability and determine the validity of all interfaces within the system.

The system test must very closely simulate actual production conditions. All users of the system should be extensively involved in this phase. A portion of the test data should be provided by user departments. All controls and reports produced in this phase must be thoroughly reviewed by the appropriate user groups.

DEVELOPMENT PHASE - TEST

SYSTEM TEST DATA

Section 8.

System Test Data

Test Data includes all data that will be used in the Test Run. If feasible, use all input normally processed. Often, it is not feasible to use all input to test a system. Control is extremely difficult when large volumes of data are provided in an initial run; thus only selected data representing all input types will be used.

A test data file is to be prepared for each master, table, and input file used in the system. Test data files must contain at least one example of each condition that can be encountered in the system. As conditions within a program change, the test data files must be updated in order to remain complete. Test data files must include all error conditions, all I/O functions, check point and restart procedures, no-data conditions, and any additional special requirements.

The systems analyst must make certain that the test data includes all possible criteria, conditions, and combinations in order to effectively ascertain the system's performance.

SYSTEM TEST SCHEDU

SYSTEM IDENTIFICATION

PAGE____ OF_

STEP	TEST	PROGRAM	INPUTS REQUIRED	FILES REQUIRED	RESULTS

DEVELOPMENT PHASE - TEST

TEST SCHEDULE

Section 9.

Test Schedule

A test schedule must be prepared which specifies how testing will progress and when it will be completed. A System Test Schedule Form will be used for establishing the sequence of operations for performing complete systems test.

Instructions for the completion of the System Test Schedule Form (FORM NO.) are:

A. Step. All operations in the test are assigned a number to indicate sequence.

B. Test. All test cases are assigned an identification number.

C. Program. This provides a cross-reference to the program number pertaining to this test.

D. Input Required. The inputs required are listed here by input name and/or reference number. Indicate whether the input contains "live" or "dummied" data.

E. Files Required. The files required are listed here by file name or reference number and the source of the file must be identified. Indicate whether the file contains "live" or "dummied" data.

F. Results. The desired results for each step must be referenced.

DEVELOPMENT PHASE - TEST

PERFORMANCE CRITERIA

Section 10.

Performance Criteria

The new system's procedures must be measured to insure that they are operating effectively.

A new system must be tested in parallel with the previous system or manual procedures, if they exist. The results of the two systems or procedures must then be compared. The accuracy of the previous systems or manual procedures must be measured against the accuracy of the new design.

The performance criteria must specify acceptable limits or error ratios. It can be anticipated that some discrepancy will occur, particularly in a test run. The performance criteria serves as a quality control specification for all conditions in the system. These must include control, processing, and output test criteria.

DEVELOPMENT PHASE - TEST

TEST PROCEDURES

Section 11.

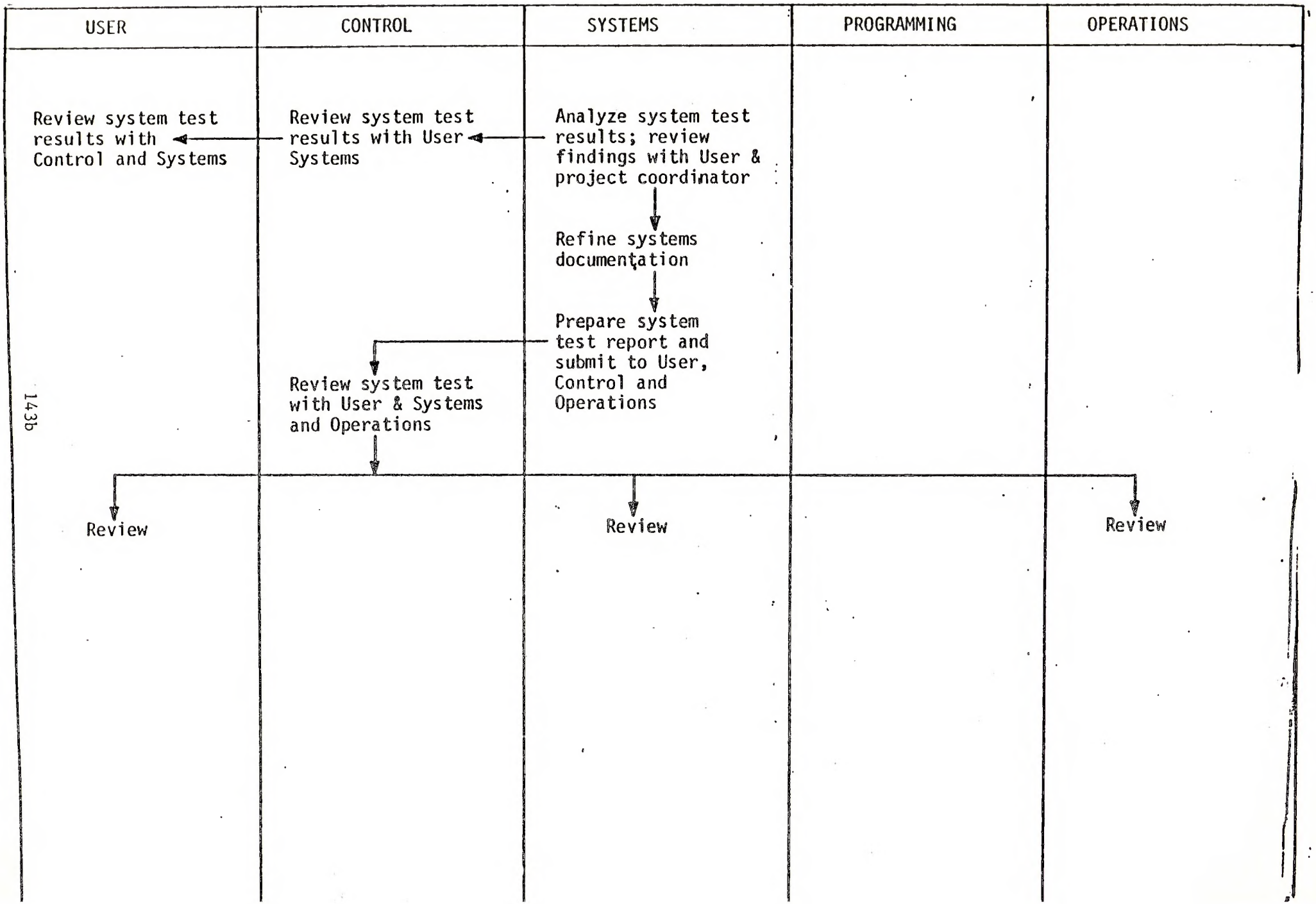
Test Procedures

The specific operations and procedures to be followed and their corresponding sequence is outlined in the diagram on the following pages. The system testing procedures described must be followed to insure that the system will operate efficiently with minimum problems. Each organizational unit must perform its assigned task in the sequence specified.

SYSTEM TESTING

USER	CONTROL	SYSTEMS	PROGRAMMING	OPERATIONS
		Assign Tasks		
		Develop system test data		
		Notify Operations of system test requirements		Review system test requirements with systems
		Establish program-to-program linkage to test system		
		Organize preliminary systems documentation		
		Obtain completed programs from Programming	Completed Programs	
		Assemble system test package & submit to Operations		Run & monitor systems test; Document results of test & forward to systems.

SYSTEM TE..ING



DEVELOPMENT PHASE - TEST

SYSTEM TEST DOCUMENTATION

Section 12.

System Test Documentation

A. Test Data. The test data documentation includes all data used to test and debug the system. Describe each input medium as to its purpose, function, and relationship to the system. The data organization, sorting sequence, indexes, and control fields are specified for each test file.

B. Test Results. Describe each output product from the test run as to its purpose, function, and its relationship to other output products or to other interfacing systems which it supports. The data organization, sorting sequence, indexes, and control fields are specified for each output file.

All test data/files are listed and maintained for future use. Include samples of the output test results.

FORMS:

SYSTEM DOCUMENTATION (A) (FORM NO.).
DATA FILE LAYOUT SHEET (COBOL).
DATA FILE LAYOUT SHEET (REX).
80 COLUMN LAYOUT SHEET (FORM 1260-9).

ADP PROCEDURES

OPERATION PHASE

CHAPTER 7

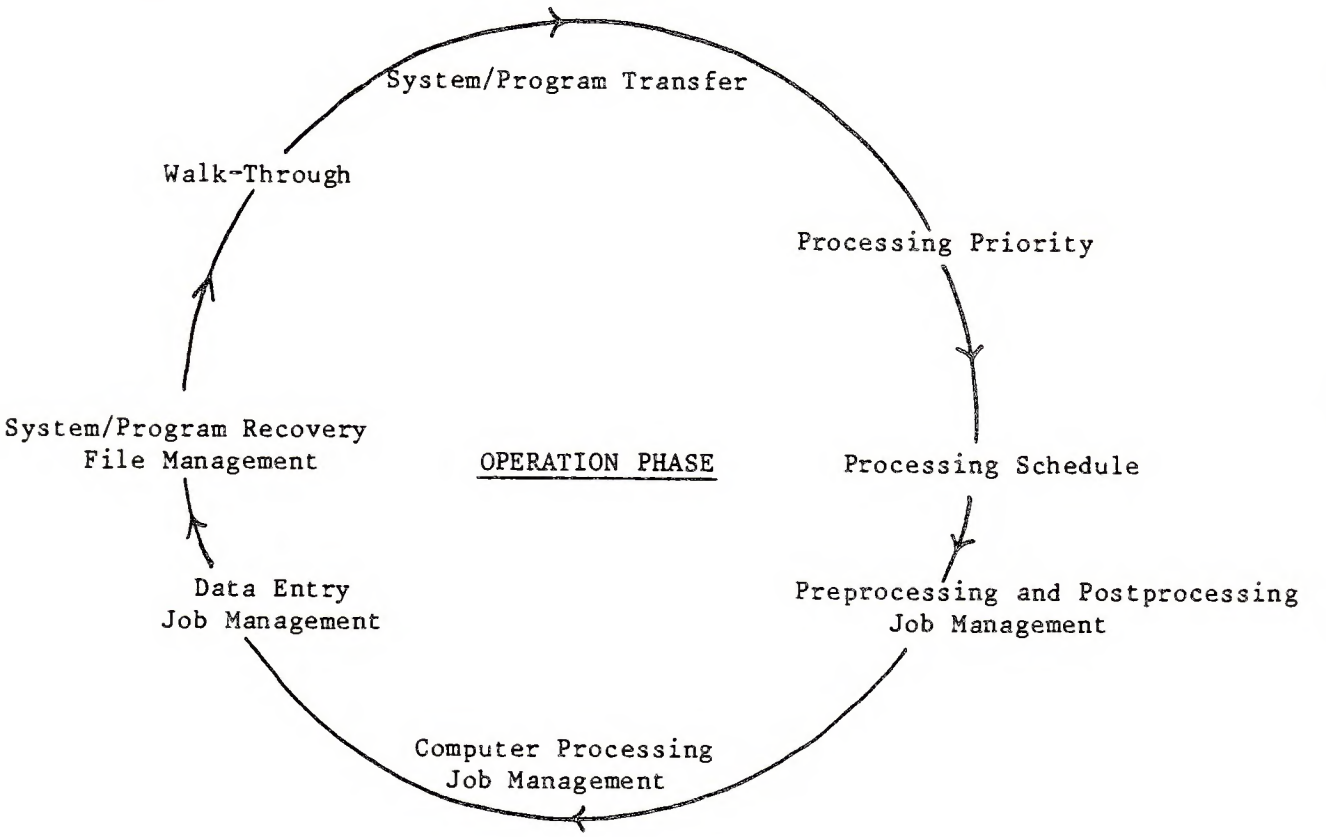
OPERATION PHASE

INTRODUCTION

Section 0.

Introduction

During the Operation Phase, the software and documentation are placed into a production status, maintained, evaluated, and changed as additional requirements are identified.



Section 0 (Cont.)

Data processing is directed to three methods:

A. On-line Usage. Terminals located at the user's work area are in direct communication with the computer, with data processing being accomplished on a computer time-sharing basis. Control of the system, programs, input data, and output data is with the user, with little or no intervention by Computer Operations or Production Control.

B. Remote Job Entry (RJE). As with on-line usage, RJE involves terminals at the user's work area in direct communication with the computer. In most cases RJE requires the input of data to a file, with processing deferred until computer resources are available. Processing results are then transmitted to the remote terminal (if terminal has output capabilities), or are generated at the computer location for distribution to the user.

C. Production (Batch). Production processing is the recurring processing of relatively large requirements, generally during those periods when on-line usage of computer resources is low or non-existent. This type of processing usually involves the Key Entry unit converting data from user documents to the computer. Production Control is responsibile for scheduling and controlling the input, processing, and output for distribution to the user. Scheduling of production runs are dictated by the recurring requirements of users, generally on a period (or time) basis.

OPERATION PHASE

PROJECT TEAM ADMINISTRATION

Section 1.

Project Team Administration

A. Upon completion of the Test Phase, the responsible project team member(s) will:
   1. Transfer the system/program and its documentation to production status.
   2. Establish processing priority.
   3. Establish processing schedule.
   4. Review and establish production control preprocessing and postprocessing job management.
   5. Review and establish computer processing job management.
   6. Review and establish data entry job management.
   7. Review and establish system/program recovery file management.

B. Walk-Through. The members of the walk-through team will vary in accordance with the material being reviewed. The walk-through is chaired by the Project Coordinator and conducted by the individual responsible for the performance of the activity.

   The purpose of the walk-through is to review the established processing environment, and determine if the priority, schedule, job management, and recovery procedures are consistent with the system processing requirements.

   The Operation Phase must be approved by the responsible individuals and management before the system can be processed as a production system.

SYSTEM TRANSFER

User Group———— System———————————— ~~DSR~~ No.————

Transfer the following software from the User Group Work System to the Production System:

Request Date——/——/—— Transfer Date——/——/—— Project Coordinator————

Work System Identification			Production System Identification		
User Code	Software Name		User Code	Software Name	Version Da
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/—
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/
———	———————	(as)	———	———————	——/——/

Form No.

OPERATION PHASE

SYSTEM/PROGRAM TRANSFER

Section 2.

System/Program Transfer

When the Test Phase is completed and approved by the responsible individuals and management, the system/program and its documentation are transfered to a production status.

The Project Coordinator will schedule a formal meeting with Production Control to turn over the items of documentation and provide the information necessary to run the system in production. Changes to existing operational programs will require only information pertinent to the changes.

A. System Transfer. A System Transfer form must be used to transfer a new system from the User Group Work System to the Production System. The transfer form is initiated by the programmer and approved by the Project Coordinator.

Instructions for the completion of the System Transfer Form (FORM NO.) are:

1. User Group. Use the user code.
2. System. The name of the system.
3. Request Date. Date the Operation Section is requested to transfer the software to production.
4. Transfer Date. Date the Operation Section transfers the software to production.
5. Project Coordinator. The name of the Project Coordinator authorizing the transfer.
6. Work System Identification.
   a. User Code. The user group.
   b. Software Name. The identification of the software on the User Work System.
7. Production System Identification.
   a. User Code. The user group.
   b. Software Name. The identification of the software on the Production System.
8. Version Date. Software compilation date.

B. Program Transfer. The Program Transfer form previously used to transfer the production software to the User Group Work System must also be used to transfer the modified software back to production. The transfer form is initiated by the programmer and approved by the Project Coordinator.

PROGRAM TRANSFER

User Group———— System———————————— DSR No.——

Transfer the following software from the Production System to the User Group Work System:

Request Date——/——/—— Transfer Date——/——/—— Project Coordinator————

Production System Identification			Work System Identification		
User Code	Software Name		User Code	Software Name	Version
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/—

Return the following software from the User Group Work System to the Production System:

Request Date——/——/—— Return Date——/——/—— Project Coordinator————

Work System Identification			Production System Identification		
User Code	Software Name		User Code	Software Name	Version
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——
————	————————————	(as)	————	————————————	——/——

Documentation Changes Required For Production System Yes—— No——

Form No.178

Section 2 (Cont.)

Instructions for the completion of the return portion of the Program Transfer Form (FORM NO.) are:

1. Request Date. Date the Operation Section is requested to return the software to production.
2. Return Date. Date the Operation Section transfers the software to production.
3. Project Coordinator. The name of the Project Coordinator authorizing the transfer to production.
4. Work System Identification.
   a. User Code. The user group.
   b. Software Name. The identification of the software on the User Work System.
5. Production System Identification.
   a. User Code. The user group.
   b. Software Name. The identification of the software on the Production System.
6. Version Date. Software compilation date.

The Program Transfer form must also indicate if there are changes to the documentation which supports the production software.

C. Documentation Turnover. The documentation required to support a new system or revised software in a production environment must be turned over to the individuals responsible for the processing and maintenance of the computer system before the system can be processed as production.

1. Program Maintenance Manual. This manual is placed in a program library which will serve as the sole repository for all production systems. A librarian must establish a checkout procedure to be observed when any item is removed from the library.
2. Operation Manual. This manual is placed in the Production Control Library.
3. User's Manual. This manual is placed in the User Organization Library. A copy of the User's Manual will also be maintained in the Program Library.

WORK LOAD PRIORITIES

Section 3.

Work Load Priorities

A. General Policy. The operating objective of the BLM Computer Center is to support the information processing requirements of the Bureau in the most effective and efficient manner possible within the constraints of manpower and computer resources. While it is our goal to provide good and reasonable service to all system users, the work load and user expectations will sometimes exceed the capability of the system to respond in a timely and/or satisfactory manner. This problem is largely the result of improper scheduling and distribution of work load across the entire period of system availability. For example, the computer is often saturated with jobs during the day shift but is usually underutilized or idle on the night shifts. Of course, management directed priority processing during the day shift and/or peak period production requirements which cannot be rescheduled also aggravate the problem.

In order to alleviate this situation, the following policy guidelines will be used to govern system utilization and allocation among the various users and functions:

1. The job mix within the computer will be controlled primarily by the automatic scheduling modules (.MSCAN).
2. Production requirements which can be satisfied with overnight turnaround will be processed on the night shifts.
3. Jobs which require large amounts of computer resources will normally be run on the night shift unless approved for day-shift processing by management.
4. Computer program development and maintenance activities will be allowed to process on the day shift. Jobs which involve only the compilation of a program will be assigned a higher urgency by the system scheduler to assure quick turnaround
5. On-line systems, such as the Mining Claim Recordation System, will maintain a high priority, both in schedule and service, unless overridden by management in special circumstances.

Section 3 (Cont.)

6. All production applications will be assigned a relative priority by management. When scheduling or processing conflicts develop between production requirements, such jobs will be processed in order, according to their priority.
7. Utilization of the H66/80 computer system will be in accordance with the schedule and operational support priorities defined in Section II, paragraphs A. and B., of the Operating Plan.
8. The system scheduler modules (.MSCAN) will include a special production job queue for each state to enable the State Offices to prioritize their production jobs. That priority scheme will apply only for ordering jobs within the queue; once a job is selected from the queue for processing, it will be treated like any other production job in the system.
9. Scheduled production jobs which fall behind schedule due to program or equipment failure will be given preferential treatment and be allowed to process on the day shift if computer resources are available.
10. System development and maintenance programmers and analysts will review all existing and future production job streams to ensure proper allocation and efficient use of system resources. This will include making the necessary JCL entries for scheduling the job to process on the night shifts when appropriate.
11. The Chief, Office of Data Systems, will be the final authority in resolving conflicts in scheduling and utilization of the H66/80 computer system. Such conflicts will be resolved in accordance with the guidelines contained in the Operating Plan. Requests for significant deviation from, or revision of, the Operating Plan will be submitted through the Chief, Division of Data Operations, to the Chief, Office of Data Systems, and the Service Center Director.

Section 3 (Cont.)

B. Schedule and Priority of Production Applications. Attachment A of the Operating Plan contains a list of current production applications, the periods during which they will normally be scheduled, the conditions under which they will be granted priority consideration, and the relative order in which requirements will be serviced in the event of scheduling and/or processing conflicts. User requests for deviation from the guidelines in Exhibit A must be prepared and submitted to the Chief, Division of Computer Operations (D-250) for consideration and action (See Exhibit B of the Operating Plan).

OPERATION PHASE

PROCESSING SCHEDULE

Section 4.

Processing Schedule

Reference the Bureau's Operating Plan for scheduling of the computer.

OPERATION PHASE

PREPROCESSING AND POSTPROCESSING JOB MANAGEMENT

Section 5.

Preprocessing and Postprocessing Job Management

These procedures are related specifically to Production (Batch) processing, the documentation required, and control exercised.

A. Production Control Organization. The Production Control Unit is a part of the Division of Computer Operations. Within the unit, personnel have control responsibility for assigned systems, or a group of systems, or magnetic tape library documentation maintenance.

B. Production Control Documentation. The Operations Manual developed during the Programming Stage of development provides instructions to be used by Production Control in scheduling, setting up, and running a given job. From this documentation Production Control will:
   1. Review the Job Control Language (JCL) Listing. In the JCL Listing, parameter data should be highlighted to define data subject to change.
   2. Prepare a CRUN. This listing is to portray the sequence of steps in the processing of the system and contains:
      Control Information.
      Input Information.
      Processing Information.
      Output Information
      a. Output files with media distinction (cards, magnetic tape, or disk).
      b. Reel number.
      c. File ID.
      d. File disposition.
      e. File retention.
      f. Comments relative to the processing.
      g. Print requirements and report distribution.

      All processing documentation will be maintained in a System Processing Manual.

C. Preprocessing Procedures. The following procedures will be performed by the Production Control personnel:
   1. At the scheduled run time for a group of programs to be processed, obtain the pertinent JCL and the system processing manual.

Section 5 (Cont.)

2. Change parameters as required.
3. Obtain copy of CRUN for scheduled run.
4. Record magnetic tape reel numbers on the input area from last run information and Tape Library Listing.
5. Forward to Computer Operations for processing.

D. Postprocessing Procedures. The following procedures are performed by the Production Control personnel:

1. Check balancing controls as specified by the Operations Manual.
2. Review JCL printout and CRUN listing to insure job was run with no unresolved problems.
3. Check reel numbers.
4. Advise user that reports are completed and distribute.
5. Record information of tape reel numbers for input to Tape Library System.
6. Place Control Reports, Job Run Listings, and CRUN Request in the System Processing Manual.

Persons responsible for preprocessing and postprocessing job management should be able to respond to any inquiry concerning the processing status of a job. Coordination between scheduling and job management functions plays a major role in satisfactory job status inquiries and operating efficiency.

Also, all requirements for security and privacy, as related to files, programs, and other data while under Production Control's jurisdiction, will be met.

(Reference "Security", Chapter 8 of this manual).

OPERATION PHASE

COMPUTER PROCESSNG JOB MANAGEMENT

Section 6.

Computer Processing Job Management

Procedures are related specifically to Production (Batch) Processing, the documentation required, and controls exercised.

All jobs will be submitted with instructions which completely detail for the computer operator what is to be done for executing the production request.

A. Processing Procedures. The following procedures are performed by the Computer Operator:

1. Obtain required tapes from library and process the job per the CRUN.
2. Attach tape labels to output tape reels as defined by Production Control.
3. Record output tape reel numbers in space provided.
4. At completion of run, make distribution of material as follows:

a.	Production Control	- CRUN Listing
		- Printer Output
		- Job Run Listing
b.	Library	- Input Tapes
		- Output Tapes

All jobs entering and leaving Computer Operations will be under complete accounting and location control at all times. The operator's primary concern is maintaining a consistently high level of computer utilization, while finishing every job scheduled into the jobstream. Jobs programmatically removed under exception control and referred to an analyst for remedial action are to be rescheduled as the analyst is notified.

Section 7.

Data Entry Job Management

A. General. Data Entry is the process of converting data from a written or printed form to a form that is recognizable by computing equipment. Data to be converted is usually contained on documents that are used in normal conduct of business. For a high degree of data integrity, the source or original documents should be used as the basis for data entry.

B. Methods of Data Entry. Most data entry in a business data processing environment is accomplished by activation of keys (typewriter-like keyboard). There are two general methods:

1. Centralized organization - user documents are submitted to a central group where data is converted to punched cards, magnetic tape, or magnetic disks for subsequent entry into computing equipment.
2. Decentralized remote - data is entered into a terminal for direct transmittal to computer equipment via a communications linkage. Terminals are located in user areas with user responsibility for control, verification, and editing as defined by system user manual.

Both methods of Data Entry are used within the Bureau of Land Management. The procedures outlined in this section of the ADP Procedures pertain specifically to the centralized Data Entry Unit. Procedures for terminal entry from remote locations are defined in System User Manuals.

C. Procedures.

1. New Job Acceptance. New or revised systems, requiring data conversion services by the Data Entry Unit, are defined and approved during the Design/Specifications stage of development.

   The Request for Key Entry Services, Data Submission Narrative, Data Keying Instructions, and Card/Record Layout forms are provided in the Operation's Manual.

Section 7 (Cont.)

2. Data Entry Control.
   a. Batches. To maintain control of documents submitted to the Data Entry Unit, users assign a batch number, as required, to a batch of the same documents. Each batch must be numbered consecutively and the date and acceptable control amount noted. This unique number will be logged in a logbook upon receipt of the documents and will be logged out upon release of the batch.
   b. Data Entry Schedule. Recurring system jobs are accomplished on a scheduled basis consistent with user requirements and overall schedule of preparation, process, and report generation. Periodic and one time jobs are scheduled based upon priority and resource availability.
   c. Data Verification. Data will be verified as required by systems requirements as defined in the Data Keying Instructions.
   d. Production Statistics. Statistics of key entry and verification by each operator for each system job will be maintained.

SYSTEM/PROGRAM RECOVERY FILE MANAGEMENT

Section 8.

System/Program Recovery File Management

A. General. The Division of Computer Operations will provide for the reprocessing of data by maintaining a backup of systems software, programs, and data files and data base programs and files. The need for a backup plan is dictated by malfunctions of equipment, software, utilities, and other factors. While it is possible to maintain a backup for reprocessing in a majority of cases, a complete backup to provide for all situations, for extended periods, is not feasible. Users must also be aware of their responsibilities in maintaining backup and restoration. Any unique backup requirements beyond the scope of these procedures should be reviewed with the User Support Unit.

B. On-Line User Backup.

1. General. User files resident on disk packs will be backed up and retained as described below. Files include: Source and Object Program Files, Data Files, Job Control Files, and Transaction Files supporting Data Base Systems. Files related to Data Base Systems (other than Transaction Files) will not be backed up as described. For Data Base File backup, see "F" below.
2. Backup. Files are backed up in Computer Operations on a periodic and daily basis.
   a. Periodic. Periodically (not to exceed 60 days), and dependent upon file state (i.e., gaps or checkerboarding) disk packs for each job family will be copied, serially, to another disk pack. The copied disk will be retained as a backup until the next disk copy is performed. The disk created will be used in operation.
   b. Daily. At days end, files that have been updated during the current work week will be copied to magnetic tape and the tape retained for five (5) days. The tape created on the last day of the work week will be retained for forty-five (45) days.

Section 8 (Cont.)

3. Limitations.
   a. Files must be properly named by the user; i.e., user code appended by file type:
      S = Source Program File
      O = Object Program File
      D = Data File
      J = Job Control File
   b. Only those files having a date change will be copied to tape for backup. Three dates are maintained within the directory entry for each file: (1) access date, (2) creation date, and (3) update date. Dates are changed as follows:

all dates initialized	- any file created
	- source, Job Control
access date changed	- data or source read
	- object executed
	- Job Control started
	- data file altered via program
update date changed	- data file altered via program

   If a file is copied and/or the name changed, dates are not affected.

C. System Software Backup. Disks containing systems software (compilers, etc.) are copied when the software is revised and retained for three backup periods in the Production Control Library.

D. Production Program Backup.
   1. Source and object programs are copied weekly to magnetic tape and retained for three backup periods in the Production Control Library.
   2. The magnetic tape produced at the end of the fiscal year will be retained in Production Control Library for three (3) years.
   3. Source programs copied to magnetic tape at the end of the fiscal year are retained for one (1) year at an off-site location.

Section 8 (Cont.)

E. Production Data File Backup. Unique data file back up and retention are defined during the Design/Specification Stage of development and are recorded in the Operations Manual documentation. Standard backup and retention are:

1. Daily. Copy all updated files to tape, retain tape for seven (7) days in Production Control Library.
2. Weekly. Copy all updated files to tape, retain tape for thirty (3) days in Production Control Library.
3. Monthly. The tape created from the daily copy at the end of the month will be retained for one (1) year in the Production Control Library.
4. Annual (fiscal year). The tape created from the daily copy at the end of the fiscal year will be retained for seven (7) years in the Production Control Library.

F. Data Base.

1. General. Data base creation, maintenance, and processing is the responsibility of users utilizing remote terminals. Backup procedures and retention of transaction data files, data base file, data base software, and Job Control are as described below:
2. Transaction Data Files. All transactions will be backed up on a daily basis provided they are on disk and have proper identification. See B. above for backup and retention procedures.
3. Data Base File. The project manager has the responsibility of generating a backup to magnetic tape of Data Base File. Generally, this is accomplished when the accumulated transaction update time is equal to or greater than the data base dump (copy) time.

(Reference "Disaster Recovery", Chapter 9 of this manual).

ADP PROCEDURES

SECURITY

CHAPTER 8

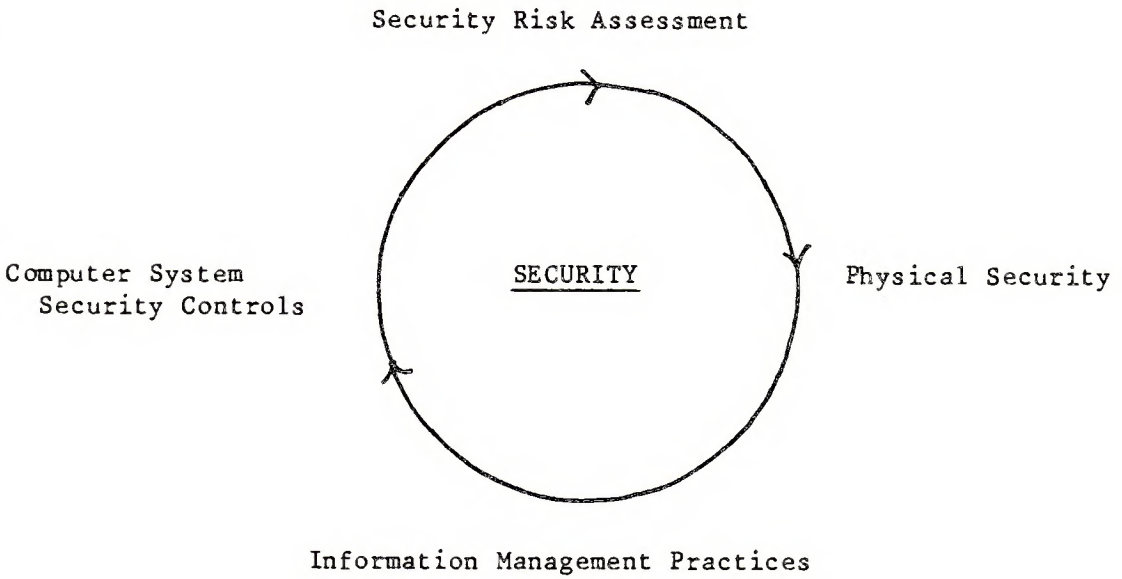
SECURITY

INTRODUCTION

Section 0.

Introduction

The Office of Data Systems Security Officer is responsible for the implementation of the security program outlined here. All employees should be aware of appropriate security measures and techniques to provide an adequate degree of security. Additional information on security procedures of automated information systems is contained in Section 1264, "Phases Approach to Security", of the BLM Manual.



SECURITY

SECURITY RISK ASSESSMENT

Section 1

Security Risk Assessment

A. Introduction. All records maintained by the Bureau must be necessary and relevant. The level of security needed to support privacy data and other records depends on the use which is made of the data, uses others could make of the data, and the harm that could result if the data is misused. Additionally, security needs are dependent upon the environment in which the computer operates. The assessment of the security risk must take into account the administrative, technical, and physical environments in which the system operates and which will become a part of the overall security action plan. Authorization for access to records containing personnel data must be held to an absolute minimum.

B. Scope. A quantitative risk assessment will produce the following benefits:

1. Objective of the security program will be related to the mission.
2. Quantitative guidance on the amount of resources which is reasonable to expend on each security measure.
3. Guidance in applying security considerations to things such as site selection, building design, hardware configurations and procurements, software systems, and internal controls.
4. Generated criteria for designing and evaluating contingency plans for back-up operation, recovery from disaster, and dealing with emergencies.
5. Generated security policy which identifies what is to be protected, which threats are significant, and who shall be responsible for execution, review, and reporting of the security program.

As outlined in Chapter 1.3 of FIPS PUB 31, and defined below, a quantitative risk assessment will be performed with documented evidence of such performance available for review.

C. Risk Analysis. In order to develop a viable security program a complete risk analysis must be performed. The following topics are to be considered, along with others as may be applicable:

Section 1 (Cont.)

1. Loss Potential Estimate. Dollar amounts must be identified on the loss of the critical aspects of the ADP facility based on the following:
   a. Physical destruction or theft of tangible assets. Costs necessary to replace and costs due to delayed processing. Includes such things as the building, special equipment, ADP hardware, supplies and materials, and office equipment.
   b. Loss of data or program files. Costs necessary to reconstruct and costs due to delayed processing.
   c. Theft of information. May be intangible and difficult to quantify as no destruction is involved. Would vary among types of data stolen.
   d. Delayed processing. Depends on the type of data system delayed and for how long. Each system should be analyzed for its "no loss" delay time, after which a cost could be assessed.

D. Threat Analysis. The probability of loss to ADP property and capital equipment is met by analyzing the following threats:
   1. Supporting utility hazards such as: power failure, air conditioning failure, or communication failure.
   2. Unauthorized access including: compromising emanations, tampering, internal theft or misuse, or intruders or vandals.
   3. Natural disasters such as: floods, earthquakes, or windstorms.
   4. Fire, either arson or caused by other circumstances including smoke damage.
   5. ADP hardware failure.

   General information about the probability of occurrence and common sense are used in developing estimates. Help in conducting threat analysis should be solicited from sources who have expertise in the above areas; i.e., fire department, building manager/engineers, hardware vendors.

E. Annual Loss Expectancy. By combining the value of potential loss with the probability of loss, an estimate of the annual loss expectancy is developed. This expectancy will pinpoint areas of significant threats and assist in determining where the most security for each dollar spent can be realized.

Section 1 (Cont.)

F. Selecting Remedial Measures. By use of the annual loss expectancy, the implementation of security measures that best suit the needs of the Division can be realized. These measures can take the following forms:

1. Alter the environment, reducing probability of occurrence.
2. Erect barriers to ward off threats.
3. Improve procedures, closing any gaps in controls.
4. Early detection of harmful situations.
5. Develop contingency plans.

G. Implementation. The following outline can be used in implementing an ADP security program.

1. A plan consisting of detailed task descriptions, a budget, schedule, and responsibility assignments should be made up.
2. A preliminary risk analysis should be performed to identify major problem areas.
3. Implement "quick fix" measures which will correct those major problem areas uncovered.
4. Perform and document a detailed risk analysis. A thorough review and full coordination and approval from the staff must be received. Users of the systems must be involved.
5. Develop action plans, complete with budget, schedules, contingency, training, indoctrination, test and audit plans.
6. Implement the approved action plans.
7. Annually review the risk analysis for changes that occurred due to the action plan implementation and system changes. Update both the documented risk analysis and the action plan.

Section 2.

Physical Security

A. Introduction. Physical security is the process of permitting access to the ADP facility to authorized persons while denying access to those unauthorized. It entails the roles of people, the criticallity of specific areas, and the time of day. The physical protection plan should establish go/no-go criteria for all combinations of the above roles and provide realistic measures to implement them.

Physical security measures are designed to provide protection against intentional or overt external acts to the division's data.

In development of the plan, a systematic and comprehensive analysis of the following must be taken:
1. Threats to which the facility is exposed.
2. Physical characteristics of the facility.
3. Organization and mission of the facility.

The goal of the plan is to achieve an optimum level of protection; i.e., neither inadequate to achieve stated objectives nor overly burdensom and expensive. In other words, the security implemented must match the degree of security required.

The following topics may be used in the creation of a physical security plan:

B. Determining Requirements. The following topics should be addressed in evaluating protection requirements:
1. Potential threat to the facility from outsiders including:
   a. Common criminals.
   b. Activists.
   c. Espionage agents.
   d. Vandals.
2. Define and tabulate control areas within the facility. Some areas which should be included are:
   a. Entrances and lobbies.
   b. Loading area.
   c. Areas within the building that contain non-ADP personnel and their proximity to the ADP facility.

Section 2 (Cont.)

d. ADP facility.
e. Input/Output control areas.
f. Data conversion areas.
g. Tape library.
h. Programming/Analysis areas.
i. Utility rooms (Air conditioning, power, UPS areas).

3. Evaluate current security measures already in place and determine the state of current practices.

With the above evaluations, specific areas where remedial measures are needed, and the selection of measures which need to be implemented, can be formalized.

C. Audit. A review of the overall physical security program must be established to:
1. Evaluate security controls for the ADP facility.
2. Provide management with a tool to improve and update its security program.
3. Provide incentive to employees and management to maintain a strong interest and a viable security program.
4. Highlight areas subject to vulnerability.

D. Scheduled Audit. Annually, a major evaluation of the ADP facility should be undertaken to insure that the Physical Security Plan is current and relevant.

E. Unscheduled Audit. As determined necessary, an unscheduled and unannounced review should be undertaken to insure that all activities are responding to established security procedures. This review will not be held in conjuction with the scheduled annual review.

F. Audit Report. Upon completion of a review, a report that includes the following will be completed:
1. Executive summary.
2. Description of the evaluation.
3. Detailed report of observations.
4. Conclusions.
5. Recommendations.
6. Supportive documentation.

Section 2 (Cont.)

7. Distribution instructions.

A follow-up review of the recommendations should be undertaken to insure that action is or has been initiated.

G. Disaster Recovery. Reference "Disaster Recovery", Chapter 9 of this Guide.

SECURITY

INFORMATION MANAGEMENT PRACTICES

Section 3.

Information Management Practices

A. Introduction. Information management is those techniques and procedures used to control operations on information in accomplishing the Division's objectives. It does not extend to essential managerial determination of the need for any uses of information related to the Division's mission. Information management includes:

1. Data collection, validation, and transformation.
2. Information processing or handling.
3. Record keeping.
4. Information control, display, and presentation.
5. Standardization of information management operations.

The effective application of these techniques and procedures will contribute to the Privacy Act objectives of maintaining accurate, timely, and complete data.

Information management security practices are designed to provide protection against accidental or unintentional damage to files or against overt internal acts to the Division's data.

An examination of current practices against the guidelines presented below will determine whether modifications or enhancements are needed:

B. Assignment of Responsibility. The following responsibilities are assigned:

1. The ADP Security Officer is responsible for examination of installation practices in storage, use, and processing of personal data, including the use of physical security measures, information management practices, and computer system access controls. Both internal uses and the authorized external transfer of data are considered with any risks reported and documented.
2. An assigned individual will be responsible during each processing shift, insuring that the facility is adequately manned and all policies on security are enforced.

Section 3 (Cont.)

3. All employees engaged in handling and processing of personal data must adhere to established codes of conduct.

C. Handling of Personal Data. The following are facets relating to personal data handling that will be implemented:
1. Preparation of a procedures handbook which details precautions to be used and obligations of personnel during the handling of personal data.
2. Labeling of all recording media which contain personal data.
3. Storage of personal data under lock and key when not in use.
4. Printing warnings on all printouts which contain personal data.
5. Color coding of all trays, reels, covers, etc., which contain personal data.
6. Record all categories of personal data contained in computer-generated reports for compliance with identification requirements.
7. Control of intermediate products which contain personal data.
8. Maintain up-to-date hard copy authorization of all individuals authorized access to personal data.
9. Maintain an up-to-date hard copy data dictionary which lists a complete inventory of all data files within the Division containing personal data.

D. Maintenance of Records. Tracing the disposition of personal data will be accomplished by:
1. Establishing procedures for maintaining correct, current accounting of all new personal data being entered.
2. Logging each transfer of each storage media containing personal data to or from the facility.
3. Maintaining log books at terminals that are used in accessing personal data by system users.

E. Data Processing Practices. The following practices pertain to data processing.
1. Using control numbers to account for personal data upon receipt and during input, storage, and processing.

Section 3 (Cont.)

2. Verifying the accuracy of personal data acquisition and entry methods employed.
3. Taking both regular and unscheduled inventories of all tape and disk storage media to ensure accurate accounting for all personal data.
4. Using carefully designed backup procedures for personal data. A copy of this data will be kept at an off-site location if its maintenance is required by law. (Reference "Disaster Recovery", Chapter 9 of this Guide).
5. Creating records retention time table covering all personal data storing, as a minimum, the data type, the retention period, and the authority responsible for making the retention decision.
6. Following any computer failure, institute a checking procedure to check for inaccuracies in personal data which resulted from that failure.
7. Examining files created from personal data files to ensure they cannot be used to regenerate personal data. Establish a formal process for determining and certifying that such created files are releasable.
8. Information concerning an individual should not be able to be traced when data is being aggregated or manipulated. Steps should be taken so that, in inference, deduction, or derivation, processes can be used to recover personal data.

F. Programming Practices. The following practices pertain to programming:
1. All programming development and modification which affects personal data must be independently checked by a second programmer who follows procedural requirements which have been developed by a responsible supervisor.
2. Current programs which process or access personal data must be inventoried on a periodic basis to verify their authorized usage.
3. All operating systems changes that involve software security require strict control and written authorization.
4. Program Design. Five major areas of programming design can significantly contribute to overall security practices. they are:

Section 3 (Cont.)

a. Audit trails. Inclusion of audit trails should make it possible to determine the status of any given piece of data at any point in time.
b. Test plan. The development of a saturation test plan should include improbable, illegal, or impossible input.
c. Program change. Programs must be designed in such a way that future changes are simplified. All changes should be authorized, approved, and documented to insure control is maintained.
d. Data record control. A wide range of checks is possible, including keypunch verification, computer matching against pre-determined values, self-checking digits, and control fields.
e. Quantitative controls. These controls should be installed, where feasible, during the design phase. They include such things as control totals, run-to-run counts, trailer records, and verification of output and input record counts.

The need for these types of controls should be determined by the risk analysis. A high risk and valid application, which consumes large amounts of ADP resources, should receive a great deal of attention.

G. Procedural Auditing. When appropriate, an independent audit should be performed to examine current established procedures and methods of insuring that these procedures are being followed. The following points should be considered:
1. Personnel performing audits must be independent of those responsible for compliance.
2. Independent auditors can be utilized at irregular intervals to provide similar assurances.
3. Completed audit reports will be maintained for inspection and assistance in tracing compromises of confidentiality.

COMPUTER SYSTEM SECURITY CONTROLS

Section 4.

Computer System Security Controls

System-based security methods are an expansion and addition to physical security measures and information management practices. They include:

* User Identification Procedures.
* Access Auditing to track activity.
* System mechanisms to control data access.

Some details are described below:

A. User Identification. Some method of identifying each individual allowed to use a system is a necessary step in safeguarding data. The three basic categories of methods that can be utilized in establishing identity are:

* Something a person knows.
* Something a person has.
* Something a person is.

The first category includes such things as passwords, combinations to locks, or a series of facts from an individual's personal background.

The second category includes badges, cards with machine-readable information, and keys to locks.

The third category consists of characteristics, such as a person's appearance, fingerprints, hand geometry, voice, or signature.

Portions of one or more of these categories may be implemented as deemed necessary by the security risk analysis and the physical security plan.

Passwords are perhaps the most widely used technique for identifying and granting access to a specific system. Some considerations in use of passwords are:

1. They should be attributable to an individual; i.e., each individual should have his own password, especially in the case of personal data files.
2. They should be easily remembered, but not based upon a person's name or personnel dates.
3. They should be changed frequently, and at random intervals, as well as when compromise is known or suspected.

Section 4 (Cont.)

B. Access Auditing. Access auditing is the ability to account for WHO has access to WHAT data. The mechanisms used for controls, known as audit trails, are designed to list all system activity, data accesses, unusual activity, etc. These controls are usually built into an application system.

C. System Access Control. System access controls serve the function of limiting the user, once having gained access to the system, from reading, altering, or destroying any data they wish.

Lists or classes of users are set up to insure they are limited to the types of activity performed, or to limit the data they can access. Either of these methods, or a combination of the two, can be utilized to insure that only data activity occurs.

ADP PROCEDURES

DISASTER RECOVERY

CHAPTER 9

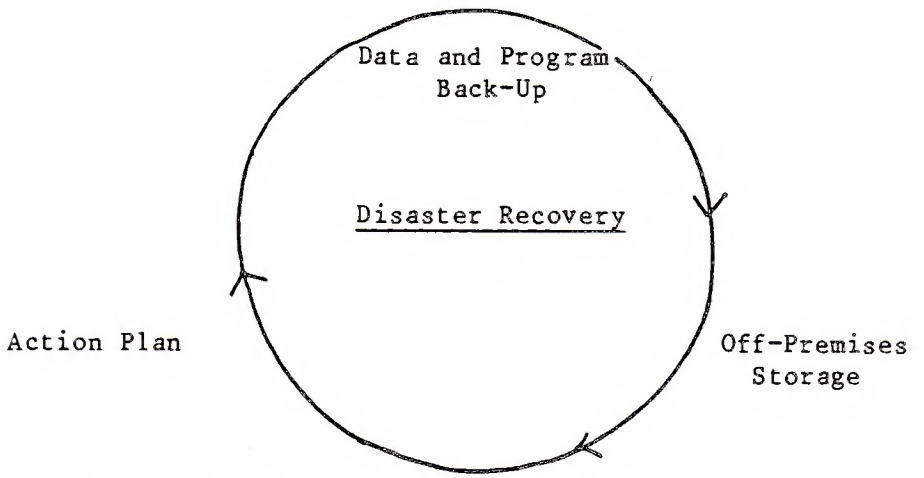
DISASTER RECOVERY

INTRODUCTION

Section 0.

Introduction

Disaster recovery provides the data, software, hardware, and personnel needed to produce the essential output of the Division of ADP if the computer center has been rendered inoperative due to causes such as power loss, flood, fire, sabotage, explosion, etc. The importance of the information produced by the Division of ADP and the large number of people affected by the provided services, such as payroll, make clear the vital nature of a disaster recovery procedure.



The Chief, Office of Data Systems, has the primary responsibility and authority for the constant state of readiness for the disaster recovery action plan, and the implementation of the plan when required. The Chief, Division of Computer Operations, has the responsibility, as delegated by the Office Chief, for prompt execution of the plan. The Security Officer has the responsibility of timely, on-the-scene security monitoring and control, including advising the Chief, Division of Computer Operations, of any necessary adjustments to security as needed for implementation. Every ADP employee is responsible for participation in disaster recovery as needed.

DISASTER RECOVERY

DATA AND PROGRAM BACK-UP

Section 1.

Data and Program Back-Up

A. Operations. All files essential to disaster recovery will be copied as specified in the "System/Program Recovery File Management" section of the Operation Phase. (Reference Chapter 7, Section 8 of this Guide.)

A list of the program IDs that are processed each day will be printed daily. Six generations will be retained.

B. Software. Prepare a test plan for initialization of the back-up computer.

C. Production Control. Additional up-to-date copies of the Operations Manuals will be provided for back-up.

D. Scheduling. A disaster standby priority list of all production jobs (and related programs) will be prepared, indicating the highest priority and continuing in descending sequence. One week's work (six days), according to agreed-upon available time and schedules at the back-up computer, will be prepared.

A special National Emergency Disaster Standby priority list will be prepared, utilizing specifications furnished by the Division of ADP Security Officer.

E. Disaster Recovery Staff. A Disaster Recovery Staff will be made up of the following personnel, or their predetermined alternates if the prime members are missing at the time of a disaster:

* Chief, Branch of Computer Operations.
* Supervisor, Operations Section.
* Supervisor, Production Control Section.
* Supervisor, Software/Telecommunications.

The Disaster Recovery Staff at all times will be under the direct supervision of the D-200 Office Chief. The staff head will act as the delegate of the Office Chief in prompt execution of all requirements. The Security Officer will control, monitor, and provide for implementation of adjustments to security.

Section 1 (Cont.)

This staff will prepare:

1. A Personnel Recovery List, identifying who is to do what in the Action Plan, including mobilization data. The list will include key vendor and back-up personnel.
2. An Emergency Notification List of their own names, office telephone numbers, home addresses, and home telephone numbers, with the same data listed for their alternates.

   A copy of this list will be:
   a. Posted at the Computer Center.
   b. Kept by each operator.
   c. Furnished to the Federal Center Security Force and to the Federal Center Fire Department.
   d. Kept by each staff member and alternate.
   e. Retained by the appropriate office at the back-up facility.
   f. Stored at the off-premise storage location.
3. A definition of a disaster that would trigger the use of the Emergency Notification List and the subsequent activation of the Action Plan. The definition would be given the same distribution as the Emergency Notification List. The severity of the disaster defined, as requiring the Action Plan, must be <u>equal to or less than</u> the following guideline: Any occurrence resulting in an estimated time for full recovery of files, software, hardware, personnel, etc., of more than 30 hours, or if an estimate is not possible or is uncertain.

   The production concept behind the guideline is to <u>start the disaster recovery process promptly</u>, recognizing that the process can be stopped readily if the emergency turns out to be more easily remedied than originally thought.
4. A signed memo of agreement with the back-up facility, in necessary detail, and providing reserved capacity for terminals and other data communications essential to disaster recovery.

Section 2.

Off-Premises Storage

The off-premises storage must have adequate security, proper temperature and humidity, be accessible at all times, be located within reasonable driving time from the ADP computer center, and be reasonably well isolated from disasters that are likely to occur at the ADP computer center.

A. Production Control. Move all files/records that are essential to disaster recovery to off-premises storage.

B. Librarian. Maintain up-to-date records, of all files/records contained in off-premises storage.

DISASTER RECOVERY

ACTION PLAN

Section 3.

Action Plan

The Action Plan outlines the basic responsibilities in the event of a disaster for providing temporary service while the computer center is inoperative, plus simultaneous reconstruction of the computer center hardware, software, and records.

A. All Personnel - Disaster Notification and Mobilization. Operators and/or software personnel working in the Computer Center are to immediately notify the Chief of the Disaster Team, or his designated alternate, upon knowledge of a disaster. The recalled disaster staff will immediately begin mobilizing personnel on the Personnel Recovery List, and initiate the following Action Plan steps:

B. Disaster Staff. The disaster staff will manage the disaster recovery Action Plan.

C. Librarian. Provide to Production Control proper generations of files, programs, operations manuals, program run records, etc., for complete initialization and running capabilities at the back-up facility.

Provide same material as above for reconstructed ADP computer center for initialization and running capabilities.

Continuously maintain off-premises storage for tapes, etc., generated at back-up facility.

D. Production Control. Transportation of all materials, etc., from off-premises storage to back-up facility. Provide proper documentation, special batch control to replace on-line terminal up-dates, etc., as required for back-up facilities operations. Notify users on special scheduling requirements, delayed testing, etc.

E. Scheduling.

1. Modify the Disaster Standby Priority list, as required by circumstances, and release to Production Control and Operations.

Section 3 (Cont.)

Coordinate with the back-up facilities scheduling function to accomplish an agreed upon working arrangement.

2. Prepare a daily run schedule for the back-up site. Prepare a daily central schedule (as computer center goes back into operation).

   Describe proper use of priority classes to operators.

3. Advise Production Control of all materials to be transported between back-up facility and Denver for every trip each day.
4. Schedule all emergency requests; clear with Disaster Recovery Staff.
5. Prepare schedules for on-line terminal hours and distribute.
6. Prepare personnel working hours schedule; clear with Disaster Recovery Staff.
7. Prepare all schedules for eventual resumption of tests, compiles, low-priority production, etc.

F. Software. Assist in initialization of back-up facility. Test initialization. Arrange for hook-up of emergency terminals if necessary. Assist in all problem solutions.

G. Operators. Initialize back-up facility. Test with Software assistance. Run according to scheduling priorities and direction.

H. Security Officer. Function as a member of Disaster Recovery Staff. Monitor security of movement of data, etc., to and from back-up facility and Denver, establishing working ground rules.

   Maintain liaison with Security Officer at back-up facility.

I. Rehabilitation and Coordination (R and C) Team. A Rehabilitation and Coordination Team will be made up of the following personnel, or their predetermined alternates if the prime members are missing at the time of disaster.

Section 3 (Cont.)

* Chief, Branch of Computer Operations (Team Head).
* ADP Security Officer.
* Contract Review Supervisor (Asst. Team Head).
* Performance Evaluation Analyst.
* Supervisor, Technical Support.
* Librarian.
* 1st Shift Supervisor, Operations.

The R and C Team will guide, direct, acquire equipment, subcontract work, etc., as is required to effectively and efficiently reconstruct and rehabilitate the computer center.

REFERENCES

1. "ADP Procedures Manual", U.S. Bureau of Mines, June 21, 1976.

2. BLM Manual, Section 1260 (Draft), October, 1982.

3. Federal Information Processing Systems (FIPS) Publications, Numbers 30, 31, 38, 39, 41, 65, 73, and 87.

4. GAO Letter (B-201441) to the Honorable David A. Stockman, Director, Office of Management and Budget.

5. "Government-wide Guidelines and Management Assistance Center Needed to Improve ADP Systems Development", Report by GAO, February 20, 1981.

6. "Life Cycle Management", Department of the Navy, August 21, 1981.

7. "Managing the Crisis in Data Processing", Harvard Business Review, March-April, 1979.

8. "Operating Plan", U.S. Bureau of Land Management.